M.I.T.'S DREAM HOUSE A new home for computer science. A new way to think about work. Page 56

CIO

THE RESOURCE FOR INFORMATION EXECUTIVES

THE NEW ARCHITECTURE

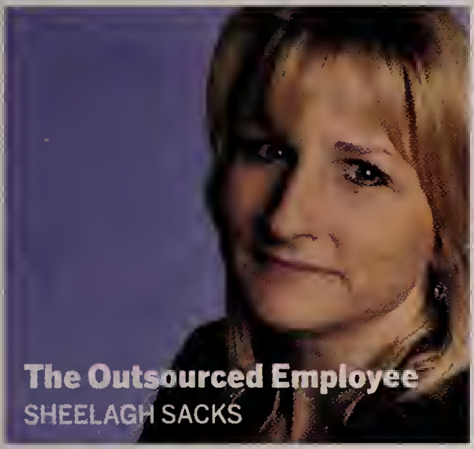
How old applications can benefit from grid computing's power and economies

Page 44

THE NEW BLOG

Michael Schrage on a novel way to track ongoing IT implementations

Page 32



The Outsourced Employee
SHEELAGH SACKS

LIFE AFTER OUTSOURCING

The CIO DICK LEFAVE

The Senior Manager
CATHERINE OLIVER-WEEMS

The Vice President
JERRY BRACE

How IT jobs, relationships and management changed at Nextel Page 36

BY MERIDITH LEVINSON

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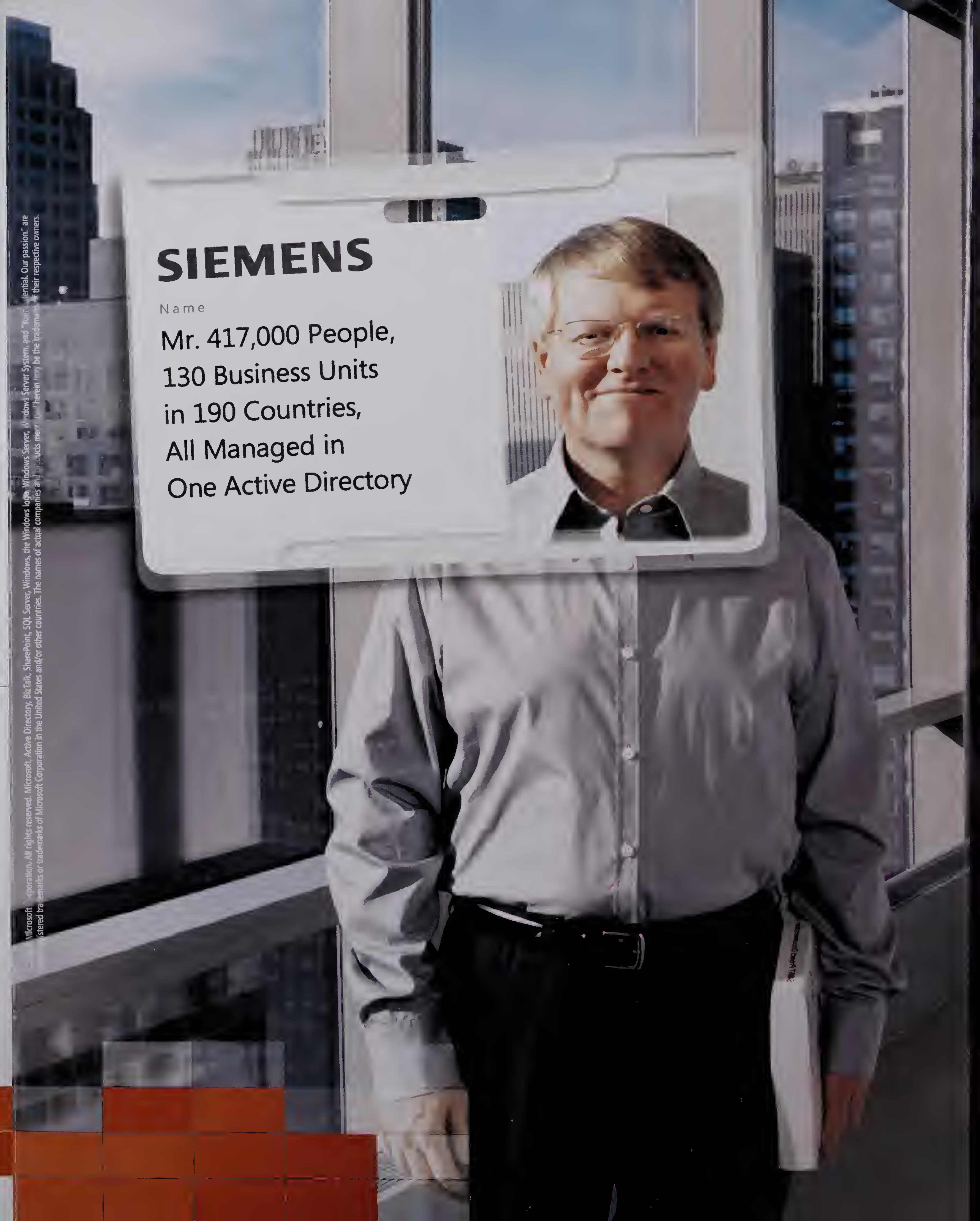

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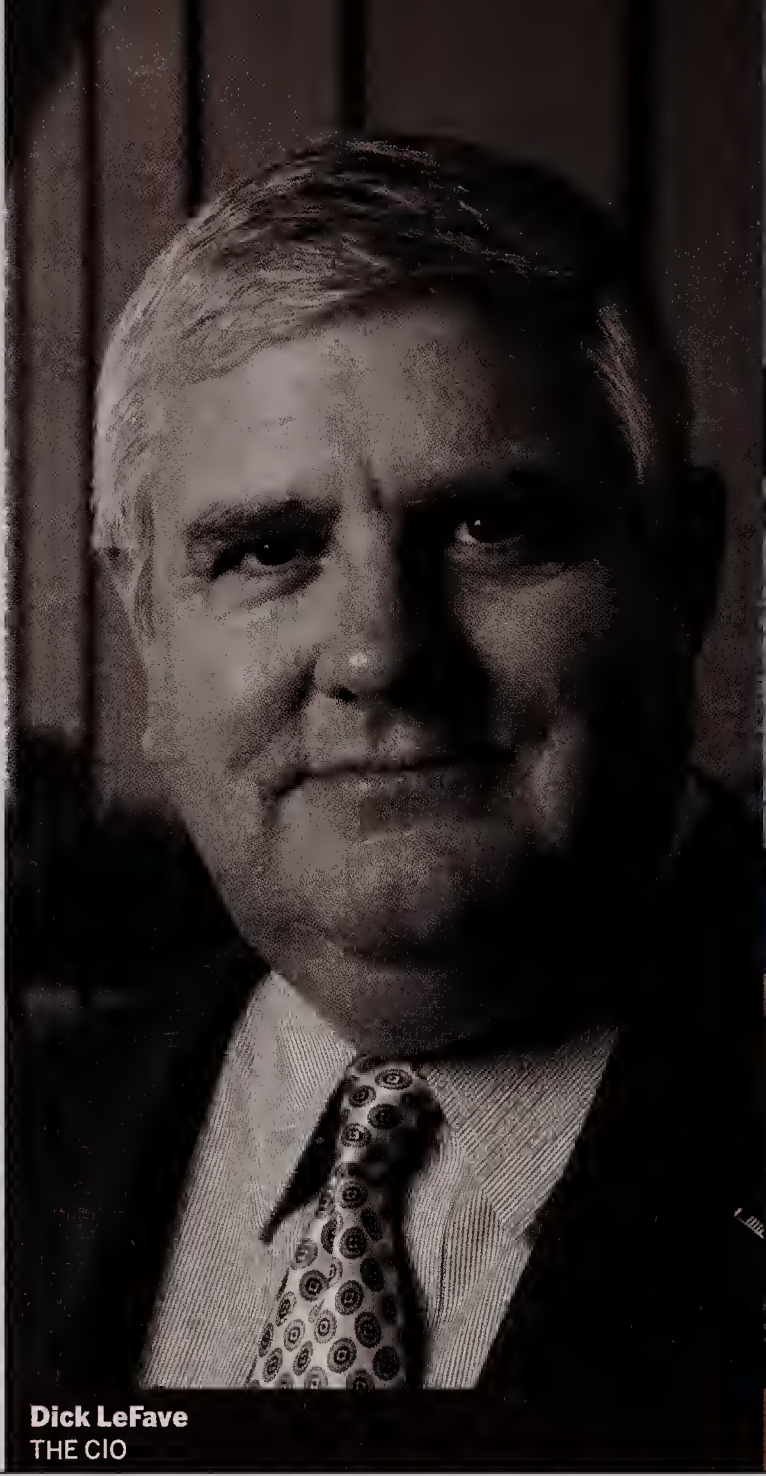
Cover Story

OUTSOURCING | 36

Life After Outsourcing

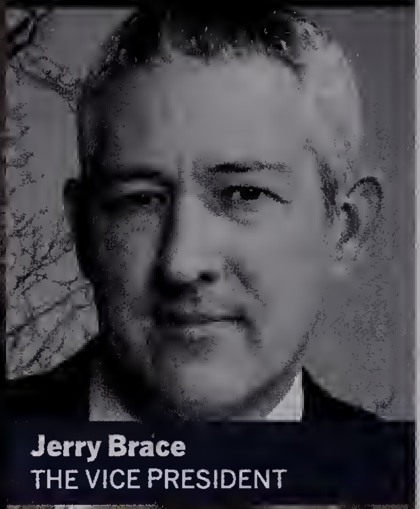
The CIO. The VP. The Manager. The Outsourced Employee. We get up close with four characters in a life- and career-altering drama that's being played out at Nextel and in IT departments all over America. *By Meridith Levinson*

COVER PHOTOS BY DRAKE SOREY AND STAN KAADY

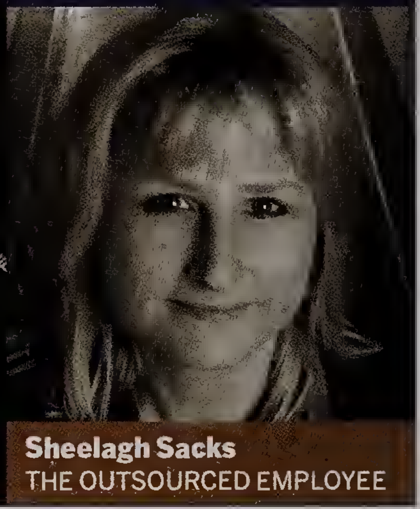


Dick LeFave
THE CIO

Catherine Oliver-Weems
THE SENIOR MANAGER



Jerry Brace
THE VICE PRESIDENT



Sheelagh Sacks
THE OUTSOURCED EMPLOYEE

"It would be very difficult for a CIO to find a technology and an application that has the payback that grid does. The cost is so low and the benefits are so high that it can't be ignored," says **Debora Horvath**, CIO of GE Financial Assurance.

Features

GRID TECHNOLOGY
True Grid | 44
Long the domain of scientists and engineers, grid computing is finally going mainstream. CIOs need to examine their applications to see if their businesses can benefit from grid's power and economies. *By Christopher Lindquist*

CHANNEL INTEGRATION
How REI Scaled E-Commerce Mountain | 52
REI demonstrates how its website functions as a sales channel that complements its physical stores. *By Megan Santosus*

ARCHITECTURE
MIT Builds Its Dream House | 56
The way computer scientists work—their strategies and goals—is changing. MIT's new Stata Center reflects that change, offering fresh ways of looking at networks, collaboration and even architecture. *By Fred Hapgood*

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CIO

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By Michael Schrage
A modest proposal for using blogs to keep IT teams and management up-to-date on implementation.

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> **It's fantasy to think you can create an entire enterprise application infrastructure simply by stringing together a bunch of Web services.**
>
> –ERIC KNORR, FROM "START WITH THE LOGIC," ESSENTIAL TECHNOLOGY, PAGE 75

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INTERACTIVE >features

Interactive features from May 15 to May 31

ASK THE SOURCE

What Does the CIO Do Now That So Much Is Outsourced?

That's a question for Nextel CIO **Dick LeFave**. His responsibilities altered radically when he shrunk his IT operations department from 285 to 20 workers. Outsourcing changes everything, as **Life After Outsourcing** (Page 36) illustrates. How do you ride the waves of role change in the wake of large outsourcing deals? **ASK THE SOURCE**. LeFave will field your questions through May 31 at *www.cio.com/experts*.

LEARN MORE

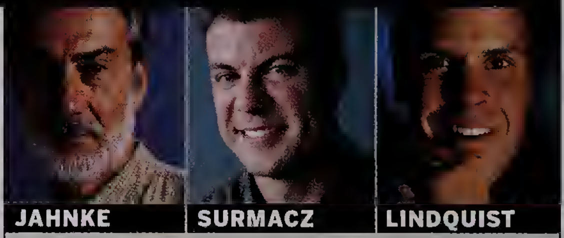
How to Read the Signs

Getting pushback when you want to move into new areas like grid computing? (Read **True Grid**, Page 44.) Former CIO and consultant Charlie Feld offered advice in a Total Leadership column recently on how to lead your organization down the path of technological change. Go to *www.cio.com/printlinks*.

ADD A COMMENT

Gehry's Eye for the Computer Guy

MIT's computer science labs are moving into a new building (see **MIT Builds Its Dream House**, Page 56). They say renowned architect Frank Gehry designed it to reflect an epic metamorphosis under way in engineering. Do you see it that way? What would a "dream house" for your IT unit be like? Scroll to the bottom of the story online and **ADD A COMMENT**.



Our Daily Web

MONDAY Tech Tact
Technology Editor Christopher Lindquist covers what's coming.

TUESDAY Quick Poll
Vote with your mouse, and see how other IT leaders feel about current events.

WEDNESDAY Metrics
Web Writer Jon Surmacz makes sense of the numbers.

THURSDAY Sound Off
Web Editorial Director Art Jahnke opines on managerial, political and ethical dilemmas.

FRIDAY The Big Picture
Charts and graphs that are worth a thousand words.

EVERY WEEKDAY The News
We synthesize the top IT news stories of the day.

Online Exclusive

The Life of Riley

Corporate decisions to outsource definitely change lives, sometimes in unexpected ways. It happened at Nextel, as CIO Dick LeFave and others will attest. For another short tale of a career turning on an outsourcing agreement with EDS, go to "Life After Outsourcing" online. Read the Web-only sidebar The Life of Riley, in which apparel-maker Kellwood Co. took some staffing twists and turns before hiring current CIO Don Riley.

PHOTO LEFT BY DRAKE SOREY; CENTER BY CHRISTOPHER HARTING

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Lowell Sando
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From the Editor

lundberg@cio.com

Want to learn which parts of an outsourcing arrangement should be "hands off" and which should be "hands on"? Post your questions to Nextel CIO Dick LeFave at *www.cio.com/experts.*

Hands Off, Hands On

THE MOST DIFFICULT PART of a new service or outsourcing arrangement may lie in figuring out exactly who does what. If both parties understand where their respective responsibilities begin and end, things will work a whole lot better. This is one of the clear take-aways from Meridith Levinson's "Life After Outsourcing," a retrospective look at Nextel's massive outsourcing arrangement (billions of dollars over multiple years), from the points of view of four players in the drama. The story, which begins on Page 36, describes how to prepare your staff for an outsourcing initiative, what it's like to go from managing people's work directly to managing a contract or vendor, and how outsourcing can affect the CIO's role and status within the enterprise.

One of the common pitfalls of large-scale systems work is that in turning over a project to an outsider (whether as part of a long-term outsourcing deal or a one-time systems development project) people sometimes relinquish oversight and direction as well. By managing ownership issues actively on an ongoing basis, the folks at Nextel avoided this trap.

Unfortunately, examples of outsourced projects gone awry are not hard to find. We profiled an extreme example in our April 1 cover story on the IRS's $8 billion modernization project, "No EZ Fix," (see *www.cio.com/printlinks*) by Elana Varon. Both the IRS and the contractor (CSC) underestimated what they were getting into; the complexity of the project may be unprecedented. But what really went wrong was that the IRS abdicated its responsibility to manage the project. According to former IRS Commissioner Charles Rossotti, it was a mistake to think that any vendor could handle such a huge undertaking without heavy input from the sponsoring organization. "We really thought we were going to have a very, very thin IRS team managing this," says Rossotti.

Given the current momentum toward outsourcing—and its many real benefits if done right—this is a lesson that all organizations must take to heart. It's *your* business and *your* customers at stake. Leadership, direction, accountability—these are just not things you can pay someone else to do.

Abbie Lundberg

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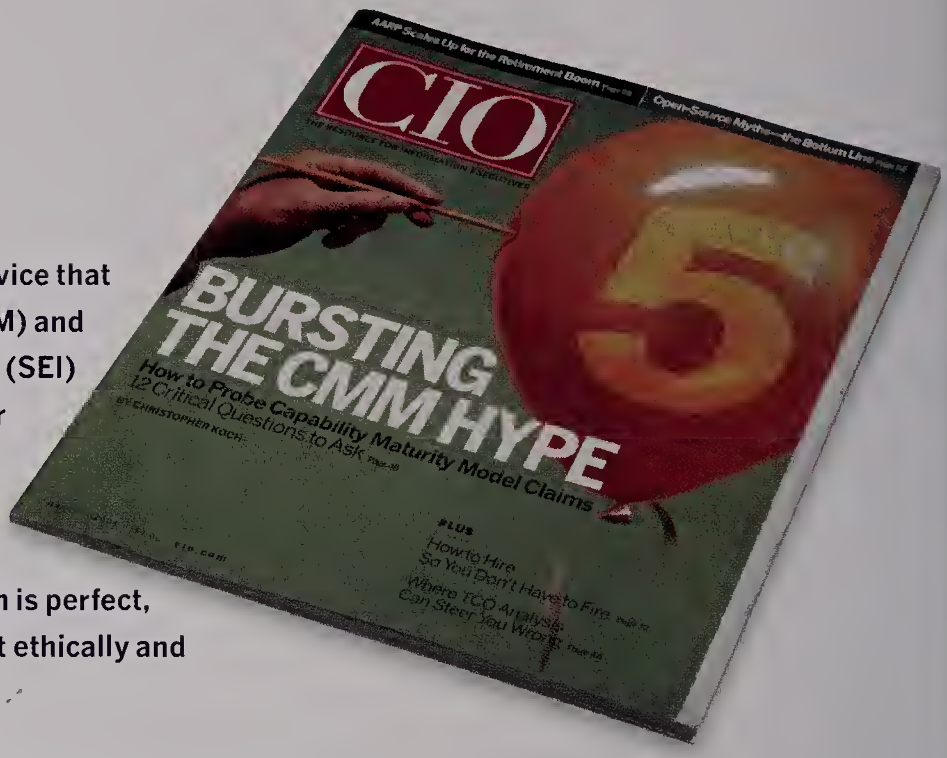
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BURSTING THE CMM HYPE
How to Probe Capability Maturity Model Claims
12 Critical Questions to Ask
BY CHRISTOPHER KOCH
PLUS
How to Hire So You Don't Have to Fire
Where TCO Analysis Can Steer You Wrong

CMM COMPLAINTS INVESTIGATED

Your March 1, 2004, article "Bursting the CMM Hype" provides valuable advice that CIOs can use to become informed buyers of Capability Maturity Model (CMM) and CMM Integration-related services. We at the Software Engineering Institute (SEI) were gratified to read the CMM described as "a powerful, complex model for continuous process improvement."

When accepting CMM or CMMI ratings as a factor in making contracting decisions, we urge every CIO to consider using something such as the "12 Critical Questions to Ask" that you listed in your article. While no system is perfect, it is our conviction that the large majority of our licensed lead appraisers act ethically and that instances of dishonesty such as those cited in your article are rare.

The SEI investigates accusations of dishonesty and takes appropriate action when they are corroborated. Dave Constant's description in your article of how he recognized and dealt with appraisal participants who had been coached is an example of the kind of diligence that the SEI encourages in its licensed lead appraisers. In addition, the SEI has instituted a Code of Conduct that defines the ethical business practices it expects from its licensees, with the possibility of license revocation in the event of a reported, investigated and confirmed infraction.

As *CIO* Executive Editor Christopher Koch pointed out, the SEI is currently concentrating on CMMI as the next stage in the evolution of maturity models that began with the CMM for software. CMMI provides CIOs with a more reliable way to evaluate the effectiveness of their development organizations and suppliers.

In addition to the code of conduct, CMMI has a rigorous appraisal method, publicly reports detailed and validated appraisal results on the SEI website (with consent of the organization's appraisal sponsor), and maintains a publicly accessible directory of current licensed lead appraisers who remain in good standing with the SEI.

We encourage your readers to contact the SEI at the e-mail address below if they have any questions or concerns about CMM or CMMI.

Bill Peterson, *Director*
Software Engineering Process Management
Software Engineering Institute
cmmi-comments@sei.cmu.edu

The profession of software development has grown too fast without the requisite checks and balances. Frameworks such as CMM assessments at best make sure that the pipes are clean. But clean pipes alone are insufficient since the source itself could be dirty. In the case of software, the source is the individual analyst or programmer.

Prospective clients diligently scrutinize the financial audit statements in assessing the financial health of a service provider because they have been trained in understanding balance sheets. But they are ignorant when it comes to assessing the core software development capabilities.

When we seek the service of a surgeon, we do not go by 10 percent sample assessments of surgeries done in a hospital. We make sure the surgeon has been licensed to practice the profession by a medical council. The council, while granting the license, takes into account the requisite education, the accreditation of the school against a standard body of knowledge and the apprenticeship served with experienced professionals. The same holds true for service professions such as architecture, accounting and law. Such licensing schemes stipulate an expiry period and make sure that continuous learning happens among professionals. Licensing of individual software professionals is now overdue.

In contracting out software, an unholy nexus develops between the client's agent (CIO, if you like) and the developer. The client does not take punitive action for deficient software services because he is beholden to the developer who had accommodated change requests in requirements beyond the contractual document during the development cycle. Software education is another gray area. Emerging disciplines such as circuit engineering and genetic engineering have developed on robust scientific lines while software engineering remains a haphazard discipline.

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It is understandable that the SEI cannot do the policing act. It is time for federal governments to create a mechanism akin to the Engineering Council or Medical Council to license individual software professionals. Attempts to merge this responsibility with licensing of (general) engineers have not succeeded because the unique characteristics required of a software engineer versus a chemical engineer, for example, had not been factored in.

We have a problem because, by some quirk of fate, we have started replacing the term *engineer* with *software*.

R. Narayanan
VP of Corporate Learning and Development
Tata Consultancy Services
r.narayanan@tcs.com

RISK MANAGEMENT IS THE REAL CONCERN

As an aviation safety counselor and pilot who also happens to be an IT professional and author, I read with amusement "Turn Off That Phone!" in the March 1, 2004, Trendlines section. Southwest Airlines and others have tried in vain to rectify the problem of air passengers not turning off their electronic devices prior to takeoff.

Anything is possible, and safety is the paramount concern. But reports also claim that aviation-based GPS systems and other approved electronics have caused unexplained events. Flight crews have reported UFO sightings, for example. The possibility of another scientific explanation has not been sufficiently explored, including human components and motivations.

Regardless, *CIO* missed the mark. The issue isn't equipment causing interference. The real issue is that our systems may be at risk if these reports are true.

IT professionals must protect our infrastructure, not shut down symptoms. We must demand testing so that claims are validated or resolved, without relying on subjective input. The result would be productivity with protection, as opposed to shutdown in fear. The safest airplane is the one that doesn't fly, and the safest network isn't turned on. Make sure the real story remains risk management, not fear submission.

Robert Padjen
Director, Technology Solutions
remoteaccess@yahoo.com

INTERVIEW ANECDOTES

I'm sure you're going to get flooded with anecdotes that identify with "I Can't Believe He Said That!" a sidebar that accompanied "How to Hire So You Don't Have to Fire" in the March 1, 2004, issue. I just had to share my favorite.

We were interviewing for a project engineering position and asked one candidate how he'd handle the situation where a system he had engineered could not be installed as designed due to some unforeseen facility constraint. He responded, "Well, it would depend on how many beers I'd had the night before." Needless to say, we weren't impressed.

Greg Altieri
VP and General Manager
CIS Security Systems Corp.
galtieri@cis-security.com

"How to Hire So You Don't Have to Fire" was of great interest to me. Having had the experience of hiring—and firing—people for over 40 years in the IT business, I know how difficult it can be to hire the correct people.

In "I Can't Believe He Said That!" a better response to the question "How would you tell a senior vice president that your project is multimillions over budget and doesn't work?" would have been, "I'd never allow any project to get that far behind without the senior vice president knowing about it and authorizing continuance or shutting it down. Project management is not done in a vacuum with a black or white surprise outcome. It is an ongoing process where the business manager is constantly updated on the progress of the effort."

Joe De Natale
Director, Data Center Planning
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denatale@clipper.com

CORRECTION

Due to an editing error, we used an incorrect figure when we referred to the cost of collecting revenue in the April 1, 2004, cover story, "No EZ Fix." The sentence should have read, "Meanwhile, the cost of collecting $100 of revenue—45 cents in 2002, the last year for which statistics are available—has not appreciably declined in two decades." We regret the error.

What Do You Think?

Send your thoughts and feedback to **letters@cio.com**. Letters may be edited for length or clarity. For a link to the articles mentioned, go to **www.cio.com/printlinks**.

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› security solutions

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trendlines

the NEW the HOT the UNEXPECTED

Edited by Michael Goldberg and Megan Santosus

LABOR

Offshored IT Workers May Get Training Benefits

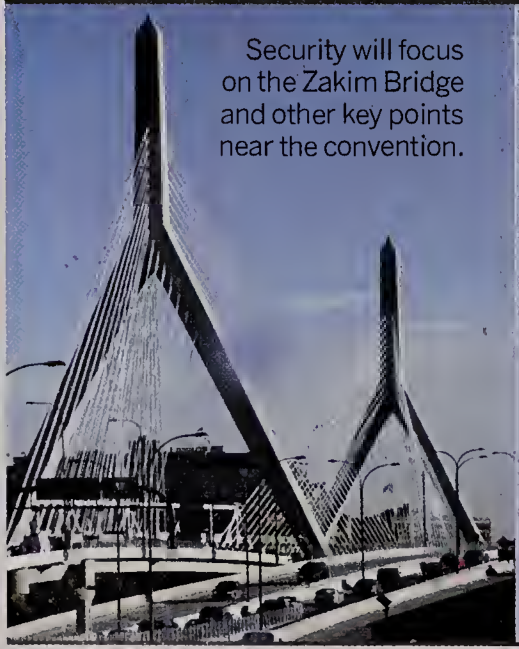
AN INTERESTING THING happened along the way to November's election: Public officials in Washington, including members of President Bush's administration, have started to heed the noisy complaints of laid-off IT workers who are left behind when companies send software programming jobs overseas.

The evidence: There's a move afoot to extend benefits devised for auto and other laid-off factory workers to software programmers.

Since 1974, manufacturing workers who lose their jobs to overseas competition are entitled to services and benefits under the Trade Adjustment Assistance (TAA) program, including a job search allowance, up to two years of training and education, up to two years of additional unemployment benefits, and health-care tax credits. All told, displaced workers can receive about $50,000 worth of benefits.

There's a new class-action lawsuit making its way through the U.S. Court of International Trade that seeks the same benefits for IT workers whose jobs have been sent offshore to countries like India and China. But the lawsuit could become moot if a movement in Congress to extend such benefits to service workers makes its way to the president's desk. A Senate bill has about one-quarter of senators signing on as cosponsors. Another bill is pending in the House. And in recent testimony before Senate committees, the White House's trade representative indicated Bush would support such a move, according to *The Wall Street Journal*. The Information Technology Association of America, the computer industry's lobbyist in Washington, also supports the idea, says Executive Director Harris Miller.

With offshore outsourcing a campaign



Security will focus on the Zakim Bridge and other key points near the convention.

PHYSICAL SECURITY

Security Trumps Transportation in Boston

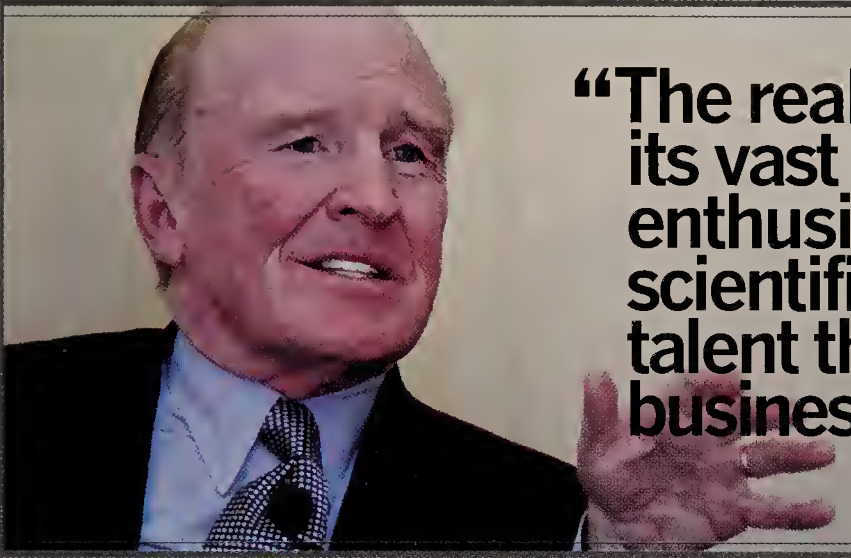
NATIONAL EVENTS nowadays demand preemptive security vigilance. For the Democratic National Convention, scheduled for July 26–29 in Boston, that means preventing an estimated 1 million interstate motorists and commuters from coming near the convention site.

The site for the expected 35,000 convention goers is the FleetCenter sports arena, also the location of the underground commuter rail hub North Station. The arena building also happens to sit within 100 feet of the southbound lanes of Interstate 93 before it runs under downtown Boston. The station will close for a full week around the convention's dates. The highway will shut down in the evening rush hour periods during the event, *The Boston Globe* reported.

Secret Service officials in charge of convention security say the closures are necessary. One source told *The Globe* that the rail station closing was mandatory after the March 11 train bombings in Madrid, Spain, which killed 200 people.

Area residents told the local media of planning vacations during the convention, or lightening workloads that week. Robert Hoffman, an IS manager from Nashua, N.H., took a fatalist view. He told *The Globe* he hoped to take a business trip when Democrats visit town and said if terrorists "wanted to do something bad, even with everything shutting down, they probably could."

ILLUSTRATION BY DAN PICASSO; PHOTOS LEFT AND TOP RIGHT BY AP/WIDE WORLD PHOTOS



"The real benefit of India turned out to be its vast intellectual capability and the enthusiasm of its people. We found terrific scientific, engineering and administrative talent that today serves almost every business at GE."

–**Jack Welch**, retired chairman of General Electric, on his first trip to India in 1989, recounted in his 2001 book, *Jack: Straight from the Gut*

IT Workers (cont.)

issue in the November presidential election, it's not a complete surprise that the idea of benefits for out-of-work programmers is getting such traction. But at the same time, it's not as if this issue has never come up before. IT workers, in fact, have applied for job retraining benefits under the TAA program. But to date, the Labor Department has rejected nearly every programmer and high-tech worker who has applied for TAA benefits, arguing that in order to qualify, a worker must have produced a tangible article. Software is not a tangible, according to Labor officials.

"We think the Labor Department is stuck in the old world," says lawyer Michael Smith of Ramirez and Smith in Spokane, Wash. Smith is lead lawyer on the suit representing 35 former IBM workers. "They say an article is something that comes out of a factory. They haven't updated their definition to include software. In the information age it is incumbent upon them to do so."

Smith, who was a software programmer himself for 15 years before deciding to go to law school, describes his case as a personal calling. "I wonder how long will Americans allow our free trade policies to destroy our job prospects," he says, adding he doesn't care if it's the lawsuit or legislation that gets IT workers their benefits—as long as they get them.

In court so far, the Justice Department denies the government unfairly rejected federal benefits for the plaintiffs. Smith says he expects a decision in the case as soon as August, and certainly by November.

That suit could be big news for outsourced IT workers—if politicians don't get there first. *–Ben Worthen*

LABOR

An Offshore Alternative

cMarket CEO Jon Carson advertised for Boston-area programmers, offering them offshore rates. He found plenty of takers.

IN MAY 2003, Jon Carson, chairman and CEO of Cambridge, Mass.-based startup cMarket, had just landed a big contract. The National Parent Teacher Association hired cMarket to build an Internet auction platform for fund-raising. Carson's company, which builds such platforms, had to develop something fast—and on a shoestring budget. He needed to hire three reliable programming contractors, but he had some concerns surrounding offshore outsourcing, the cheapest option presented to him. "In product development, there are very tangible benefits to having your developers literally sitting next to the project manager and marketing people because they can get the nuances of product demand," Carson says. Plus, in tech-battered Boston, he didn't feel right outsourcing valuable jobs.

So Carson decided to advertise in *The Boston Globe*. The catch: He offered the positions at a relatively low salary of $3,500 per month (or $42,000 annually), an amount comparable to offshore programmers' rates but considerably less than the $80,000 to $100,000 typically commanded by Boston-area talent. Yet despite the lower wages, cMarket found no shortage of interest—in three days, Carson received 120 résumés. He hired three people, two of whom have since become full-time employees with higher salaries.

Carson says his experience hiring locally rather than outsourcing was quite positive. The three contract employees helped cMarket ramp up for the PTA project and also contributed to new product ideas that eventually increased business. The end result: The company grew from a six-person startup to an operation with 30 employees.

Carson says he investigated offshore outsourcing, but decided that it wasn't the best option for cMarket. He was particularly concerned that offshore programmers wouldn't be able to help cMarket get off the ground given that he had to communicate his business strategy and goals to distant programmers with no stake in his entrepreneurial dreams.

Because of the success of his approach, Carson has been touting it to other CEOs in similar situations. And executives seem to be interested. Carson has received numerous phone calls and hundreds of e-mails inquiring how he was able to grow his business without having to hire expertise abroad.

While cMarket's stance won't stem the tide of companies going the offshore route, it does offer an interesting alternative. "As corporate America is outsourcing, they are throwing good talent overboard," Carson says. *–Julie Hanson*

By the Numbers

By Jon Surmacz

Software Licensing: Shift to Subscriptions Means More Choice for CIOs

SOFTWARE VENDORS offer two kinds of licenses: perpetual (you pay for the product up front, you own the product in perpetuity) and subscription (you pay to rent the product until the term runs out). Today, most vendors derive a majority of their revenue from perpetual licenses. However, because perpetual licenses are more susceptible to market changes, resulting in revenue peaks and valleys, vendors are starting to show an inclination toward subscription licensing, according to a recent report by IDC. Subscription licenses offer steadier revenue patterns because they can be renewed every year.

What does the trend mean? Well, it should be good news for CIOs, according to IDC, because software customers on the lookout for the best deal will find choices in software pricing. "Customers won't be forced down the road for either type of software license," says Amy Mizoras Konary, IDC program manager for software pricing, licensing and delivery. "This will enable customers to have more choice and save them more money."

Best Practices

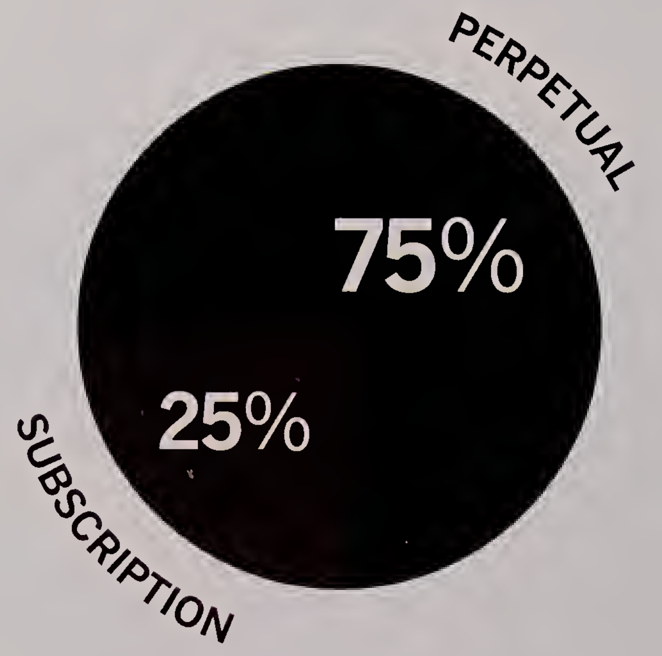
1. Centralize your license management. Software customers are managing hundreds of distinct software contracts across multiple locations. By centralizing management of these licenses (with software from companies like Macrovision), customers can make sure that they don't buy too much, or too little, software across the organization.

2. Define what value means to you (and make sure your vendors understand). Software vendors know that they need to do a better job of communicating the business value of their products. In order to do this effectively, vendors need to know how customers will be measuring their software's effectiveness and value.

3. Realize that flexibility and simplicity in licensing are often mutually exclusive. Customers are demanding flexibility and simplicity in software licensing, but if vendors are to offer more flexibility, the byproduct will often be complexity.

The Software Market Today

Most software licenses are forever



SOURCE: IDC, "The Future of Software Licensing"

The Software Market Tomorrow

By 2010, many vendors will shift from perpetual to subscription licensing

43%

of **vendors** believe it is highly likely that a majority of worldwide software revenue will come from subscriptions.

BUT ONLY

26%

of their **customers** think so.

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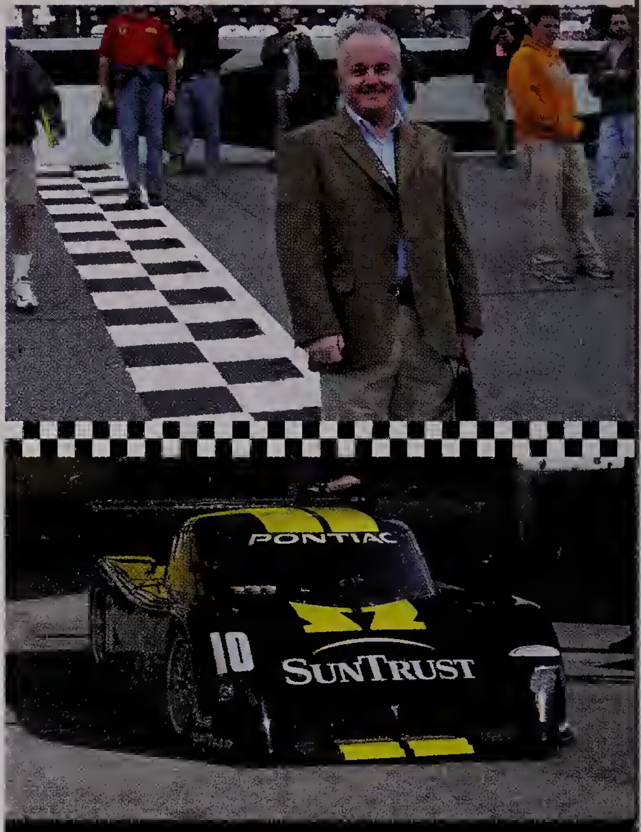
CIO CAREERS

Moving to a Real Fast Lane



Former CIO Bob Whyte combines auto racing with IT to create speedy synergies.

BOB WHYTE, a racing hobbyist and former CIO, can recount thrills and spills in two parts of his life with good humor. A *Road & Track* reader since he was seven, Whyte can talk about driving a race car and smashing into a stalled car while rocketing through a cloud of smoke at 115 miles per hour (only to escape unhurt). He can relate how he left a stable job as CIO at DirecTV during the Internet boom in 1999 and served in C-level posts at two dotcoms.

It's only now that Whyte has started a business that seeks to combine his interests in IT and auto racing that he acknowledges being a tad nervous. Whyte has started his own auto racing company, Los Angeles-based Integrated Performance Technology (IPT), which includes an auto racing team in the Grand American Rolex Sports Car Series (*www.grand-am.com*). In the process, he's working to assemble players from the IT industry to sponsor IPT's race entries and conduct IT conferences on racing weekends.

"Big IT projects have four pieces: hardware, software, consulting and telecom. Project partnerships like that can be a natural sponsorship fit for the IT-rich world of auto racing," Whyte says.

Whyte has teamed up with Wayne Taylor, 47, a two-time World Sports Car champion. Taylor helped create SunTrust Racing, a partnership between IPT and Atlanta-based SunTrust Banks. Taylor will pilot a Daytona Prototype race car for the team.

Taylor says he was intrigued because "the business model was something I hadn't seen in my 30 years of racing," he says. IT sponsors will be able to invite potential clients to IPT-run Race Weekend conferences.

Jeremy Shaw, a veteran racing broadcaster and a senior editor at *Racer* monthly magazine, says the IPT model that mixes IT and racing offers a good business hook.

And IT is part of the sport, Whyte notes. Pit crews now equip top-level race cars with three built-in microprocessors and use wireless telemetry and data mining tools to quickly analyze the 8MB-sized packets of data that monitor engine performance, oil condition and driver braking habits, among other things, during each lap.

SunTrust Racing's car finished first at April's Food City 250 race in Phoenix. IPT plans to add an IT-sponsored car in August.

Whyte calms his business nerves when he thinks of the races on tap. "I love the excitement, the speed and the competition of it all," he says. *–Stewart L. Deck*

CRIMINAL JUSTICE

Fed Fingerprint Database Spreads Across U.S.

THE WIDER USE of fingerprint scanning technology in recent years has made it easier than ever for law enforcement officials to share information about criminals and quickly compare a suspect's fingerprint image with millions of similar imprints, according to a January report from the General Accounting Office. But it can still take small police departments that can't afford the electronic equipment more than five months to mail batches of fingerprint cards to state repositories, the report said.

The GAO found that a 1999 FBI program called the Integrated Automated Fingerprint Identification System (IAFIS) is increasing the use and accuracy of a federal fingerprint database.

The IAFIS program was created to encourage nonfederal law enforcement agencies to submit criminal fingerprints to state databases, and then to the federal IAFIS database. Though state and local police make about 94 percent of felony and serious misdemeanor crime arrests, as recently as 1999, only around 45 percent of fingerprints collected from those arrests made it into the federal repository. In addition, it took an average of 118 days for prints to make it from local law enforcement to the FBI's fingerprint collection, according to the report.

As of May 2003, the feds were receiving around 70 percent of criminal fingerprints submitted to state repositories, and the time taken to submit the prints has shrunk to 40 days, the GAO said.

However, the GAO found that many small law enforcement agencies still don't have the money for Livescan optical scanning equipment that allows them to electronically submit fingerprints. Law enforcement agencies also need to improve their procedures for getting fingerprints submitted to state and federal repositories, especially where electronic submission equipment doesn't exist, the report found. Many agencies in small cities still work with paper fingerprint cards and manual processes, and mail the cards in batches to state repositories—a process that, in the past, has taken up to 169 days.
–Paul Roberts

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MEGABYTE:

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Washington Watch

Edited by Elana Varon

New Life for Broadband Debate

VoIP regs prompt politicking about fast Internet connections

THE FEDERAL COMMUNICATIONS COMMISSION is moving forward with a plan for national regulation of voice-over-IP (VoIP) services, prompting a political debate over the government's approach to promoting broadband Internet access generally.

Demand for VoIP could drive high-speed Internet adoption in households, according to the FCC, and financially strapped telecommunications companies are jockeying for more of this potentially lucrative market. Broadband advocates say encouraging consumers to use this technology would create demand for other online products and content, resulting in more jobs.

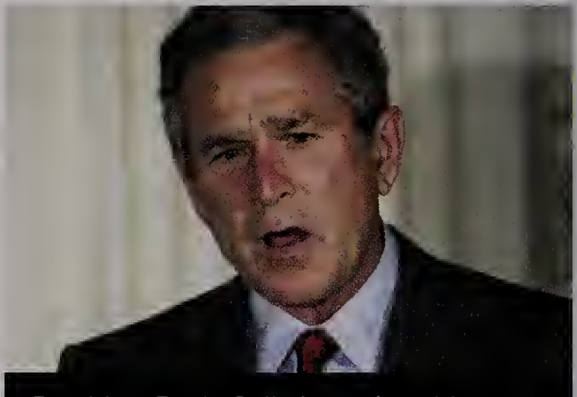
The issue is politically important enough that President Bush has weighed in. In a March 26 speech that was mainly about homeownership, Bush called for universal, low-cost access for broadband services supplied by numerous providers by 2007. Bush's remarks came two weeks after Reed Hundt, an adviser to McKinsey & Co. and President Clinton's FCC chairman, accused Bush of not moving fast enough to build a nationwide broadband infrastructure and of favoring existing big telecom companies over new competitors.

Matthew Flanigan, president of the Telecommunications Industry Association, says broadband had not previously been a priority for Bush. Flanigan says that if the president "[sets] the right tone, that's going to get investors interested."

Bush called for "plenty of choices" of service providers for consumers. These include alternative technologies, such as broadband over power lines, along with service over cable or telephone lines, says Mike Gallagher, acting administrator of the National Telecommunications and Information Administration, the agency that advises the president on telecom policy. Bush also wants Congress to avoid taxing broadband access.

Hundt, at a forum about VoIP, charged the FCC with protecting the interests of the major telephone carriers at the expense of newer competitors. He has called for a policy that includes federal funding to expand broadband options for consumers and making faster connections available.

The FCC has recently backed away from regulations that require the Baby Bells to share their networks with competitors. But an FCC spokesman says the agency is helping small VoIP providers find a market for their products. Republicans on the FCC, as well as VoIP providers, also argue that a patchwork of state regulations would hamper deployment. *–Grant Gross*



President Bush: Calls for nationwide broadband access by 2007

PHOTO BY AP/WIDE WORLD PHOTOS

Lack of Training Led to Security Breach

New systems administrator left access open to Democrats' files

FOR 18 MONTHS beginning in October 2001, two Republican aides to the Senate Judiciary Committee repeatedly hacked into Democrats' files stored on the panel's server. These acts, which may lead to criminal charges, could have been prevented with better IT oversight.

According to a report issued in March by Senate Sergeant at Arms William Pickle, a poorly trained systems administrator allowed unrestricted access to the files, which contained notes on the Democrats' political strategy. Another systems administrator noticed, but never told his colleague or the Senate's IT department. The employee responsible for the breaches left before anyone discovered what had happened.

Senate CIO J. Greg Hanson says his authority to set security policies is limited because each Senate committee operates independently. But he says he could have offered more training and done a better job publicizing security best practices. Now he is planning to offer a certification program for all new systems administrators.

The Pickle report says that in August 2001 the Judiciary Committee, which had recently switched to Democratic control, hired a systems administrator who was fresh out of college. According to an unredacted version of the report, that fall, Jason Lundell, a Republican aide, watched the administrator access Democrats' folders and found that he could gain access by copying what the administrator did. Over 18 months he and a more senior accomplice, Manuel Miranda, downloaded more than 4,600 files. Miranda has admitted to reading some of the documents but contends that his actions weren't illegal. Lundell's lawyer has said he doesn't expect his client to be prosecuted because he cooperated with Pickle's investigation.

The report says that the Democrats' systems administrator had left user permissions open whenever he set up a new account. With just seven exceptions, every folder on the Judiciary Committee server created after the new administrator started was accessible.

The major lesson here isn't new, but Hanson says it bears repeating: The biggest threats don't always come from outside. It is easy to get distracted by viruses and other big threats, Hanson says. But little things—like allowing employees access they shouldn't have—can hurt just as badly. *–Ben Worthen*

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INVENTIONS

A New Frontier in Product Design

ERGONOMIC DESIGN SOFTWARE is in the toilet—literally. In what may be a classic example of technology gone too far, Osaka Gas Co.'s Homepro subsidiary has applied to a bathroom environment a heart rate prediction model of Osaka's Cups (comfort, usability, performance and safety) system. Why, you might ask? The Japanese company's "Physical Demand Simulator in Bathroom" tool simulates how blood pressure and muscles are affected when users get up from the toilet seat—essentially trying to gauge stress levels for Japan's geriatric bathroom-users in an effort to help toilet designers and manufacturers devise ergonomically friendly commodes. Osaka's Cups system integrates software called Jack from UGS PLM Solutions, a subsidiary of EDS that is being acquired by a private equity group. Is Jack up to the tough task? "The software generates human performance models, looking at injury risks, strength capabilities, comfort and vision analysis," says Ulrich Raschke, manager of human simulation products at UGS PLM Solutions.

Osaka is also using Jack to see how a homemaker operates in the kitchen. The eventual goal: data provided by Cups will help manufacturers and designers create products and layouts that reduce the stress of certain movements. For example, Jack simulates the motions as a homemaker retrieves a bowl from the refrigerator, washes dishes or moves her head as she lights a burner on a stove. Along the way, Jack also simulates her vital signs. As a result of the simulations, Osaka discovered that all of the homemaker's actions can be accurately accounted for in nine basic movements. (We gather that tripping over the family dog with a pot full of boiling water was not one of them.)

Jack is hard at work at more than just toilet and kitchen ergonomics. Companies including Ford, Deere and Pratt & Whitney put Jack through his paces to come up with better ergonomic designs for cars, lawn mowers and aircraft parts. Now, about that cramped airplane bathroom.... *–Thomas Wailgum*

PUBLISHING

Forget e-Books. Say Hello to d-Books.

OK, SO THE ELECTRONIC book didn't wind up saving the publishing industry. But IT is behind another development that's steadily upending the way people make books: print-on-demand.

Think of print-on-demand (POD) as just-in-time manufacturing for the publishing world. Many printing houses now offer digital print-on-demand as an alternative to traditional offset printing, a painstaking and time-consuming process that's economically best suited for larger print runs (say, 5,000 to 10,000 books). POD allows publishers to order much smaller quantities of books, even down to one, thereby providing an easy way to keep backlisted titles available and essentially ensuring that books never go "out of print."

Digitally printed books have long been stigmatized as cheap and cheesy, but steady improvements in technology have brought us to the point where it's getting harder to tell the difference between an offset four-color hardcover and a digital version of the same tome.

Under the hood, print-on-demand is fueled by the highest-end versions of the same digital print technologies used in millions of home computing setups, says Chuck Surprise, editor and publisher of the industry resource site PrintOnDemand.com. Adobe's page description language, PostScript, and its ubiquitous PDF file format are combined with very high quality digital printers from companies like Xerox and Kodak, which are capable of reproducing the highest-resolution color on book-quality paper stock.

Print-on-demand is still a small piece of the printing market, according to CAP Ventures, but it's the chunk with the largest growth potential. CAP estimates that the retail value of POD will jump from $33.2 billion in 2003 to $60.2 billion by 2008, a healthy 13 percent compound annual rate.

POD is also driving growth in another market: wannabe authors. For fees ranging from $199 to as much as $1,600, writers can publish their books, choosing from a menu of options that include hardcovers and four-color printing. With very small print runs now economically viable, companies like iUniverse, Xlibris, Lightning Source and 1st Books (now known as AuthorHouse) are aggressively marketing self-publishing services to writers.

Some publishing industry heavyweights are backing POD. Barnes & Noble owns part of iUniverse, Xlibris counts Random House as a major investor, and Lightning Source is the POD subsidiary of Ingram Industries, one of the largest wholesale book distributors in the country.

Long term, industry watchers like Surprise think digital's day is here to stay. "There are people who value traditionally produced hardbound books," Surprise says. "Other people would rather be able to go into a bookstore, order a book, have it printed, and come back in five minutes to pick it up. That's the promise of print-on-demand." *–Tracy Mayor*

ILLUSTRATION BY DAN PICASSO

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The Ties That Bind

To succeed at the next level, leave the day-to-day details behind

ILLUSTRATION BY GREG GRIGORIOU

IN EVERY CAREER there are both milestones and plateaus, which are alike in that they take effort and new skills to hurdle. The single biggest challenge, however, is letting go of what I call the transactional level of leadership.

Remember how hard it was to learn to delegate in your first management job? You were in charge of a unit; suddenly you found yourself leading the organization. You stayed actively involved in the day-to-day transactions. After all, you had been the best salesperson, technologist or whatever in your particular field. You had made it this far on those skills. Therein lay the next challenge—and the key to advancing your career up the proverbial ladder. The things that made you successful in the past could be the very things that retard your growth to the next level.

I once worked with the president of a large company who had earned his stripes as a marketing executive before taking the top spot. Chaos reigned almost immediately. He did not fill the marketing position; he drove his staff through multihour meetings late into the night. He was literally working around the clock. He could not let go of the tasks that had made him successful. During one midnight conversation, I cautioned him, "You cannot do 37,000 jobs, but you can fail by trying." He gradually grew into the job but not before imposing a lot of pain on his organization and himself.

The challenge of letting go of transactional leadership exists at every level in organizations: when moving from a team member to head of the team, from manager to executive, from departmental executive to CEO. To be successful in these moves, you must move yourself from a transactional style.

There are several challenges that one must overcome in order to move through that transactional level of management to a big-picture leadership style. The term "transactional" as used here may differ from the academic definition, but it suffices to describe the conditions I have observed in real companies.

Letting go of the tasks that you have enjoyed doing and that led to your success may be difficult, but if you don't, you will remain mired in your experience rather than benefiting from what you have learned. Consider the question: "Do you have 10 years of experience or one year of experience 10 times over?"

A former colleague depicts a leader as a juggler, with more and heavier balls being added as you move up the ladder. Even the best jugglers will eventually drop a ball. Reaching for the lost ball, the juggler drops more balls and thus begins a cascade.

To succeed, the juggler has to learn that he can't keep an increasing number of balls in the air; he has to let some go. I believe the challenge is to be aware of your changing situation as you progress. In transactional mode, you are initially juggling the transactions of one organization. When you excel at juggling 20 simultaneous transactions in that organization, your reward is to add a second organization. As in the aforementioned case of the president, you cannot manage 40 simultaneous transactions. You must now become adept at juggling the people who manage those transactions while you concentrate on the bigger picture. And so on up the ladder. The next level is to learn to juggle organizations. To avoid failure, voluntarily toss a ball aside before it drops.

New leaders often ask how they can gauge whether things are moving in the right direction if they are not personally involved. There are lots of ways to keep one's finger on the pulse.

Here are some strategies you can consider to help move you beyond transactional leadership.

Get the big picture. Entangled in transactions and day-to-day crises, you cannot see the forest for the trees. But you need to understand the big picture. View your company from the outside without the distraction of politics.

Be cautious of extrapolating from today's situation. Aiming for progressively higher levels of your current goal may work for a while, but today everyone must consider the potential annihilation of the existing business by some external force.

Keep your finger on the pulse. New leaders often question how they can gauge whether things are moving in the right direction in their organization if they are not personally involved at the transaction level. There are lots of ways to keep one's finger on the pulse of the organization.

One of my clients has a "Top Two" meeting every Monday morning by phone. Each staff member briefly describes his or her top two priorities. This promotes shared communication and crisp identification of the hot items. Extended stays in the top two may indicate where there are problems that need high-level intervention. Develop critical indexes, such as customer satisfaction measures, ROA or productivity, that will allow you to manage in the aggregate.

Focus on what's important. Make sure the organization also has an effective process for setting priorities. Boiling things down to the vital few initiatives enables you to avoid the overreaching that is so common in resource-strapped companies. Rigorous priority-setting is always difficult, particularly when you have to say "no" to a business unit or customer. But with the appropriate rationale, the rigor at the front end is less painful than the multiple failures at the back end.

Treat time as the enemy. Does your day drive you or do you drive your day? It *is* possible to contain the hours but you must take control of your time. Set limits and stick to them. Be sure your assistant knows the boundaries for putting something on your calendar, so that your day is not eaten up with transactional decisions. Be sure to allot an appropriate amount of time to big-picture leadership. Don't allow yourself to drop back into the old mode.

Look to the future. Initial discomfort with the struggle to break through the transactional level can lead to regressing. I loved the excitement of working with the field organizations. When I was promoted to a corporate position, it seemed more stilted. I felt as though every one whispered in the halls. I missed the shouts of joy from the field.

It took some time and some persistence, along with the support of my mentors, to find the fun that lies in setting the direction for others to follow. I disciplined myself to move forward and not let the memories of the past pull me back. Now the strategy role is my favorite part of work.

Once you've moved past the transactional level you can reap the very real rewards. You will see the benefit of being able to leverage more than just your personal skill set.

- You will become a role model for your people, helping them to learn how to make a similar transition.
- Your contribution to the business will be enhanced.
- You will demonstrate your readiness for the next level.
- You will leave a sustainable organization—one that will be able to pursue its mission and goals long after you have moved on to your next opportunity.

The old saying goes, "It's what you learn after you know it all that counts." To succeed at a higher level, let go of your old job.

Send your thoughts on this column to *leadership@cio.com*. Before retiring in 1999, Patricia Wallington was corporate vice president and CIO at Xerox. She is now president of CIO Associates in Sarasota, Fla.

Michael Schrage | Making IT Work

It's All About the Execution

The Virtues of Chitchat

A modest proposal for using blogs to keep IT teams and management up-to-date on implementation

MY FORTUNE 500 friends are always forwarding their more Dilbertesque corporate e-mails to inspire me. Such missives are typically hysterical. (My favorite is the one that informs IT people that there's a freeze on hiring and salaries, and that the company is exploring outsourcing options and expects their help in managing the process.) But as a change of pace, one enterprising Fortune 100 buddy took the liberty of sending me a clever and provocative internal corporate blog.

This blogger had quite the tale to tell. He was one of the IT minions supervising the installation of a rather large and unwieldy global ERP system replete with Bangalorean outsourcing and Big Four consulting hordes. His blog—with links to internal sites that, alas, I couldn't access—described what aspects of the rollout were going well and which ones were horror shows in the making. It was a good read; I learned a lot.

But I couldn't help thinking: What kind of company actually allows an unauthorized, unedited blog about one of its most sensitive projects? While transparency and openness behind the firewall may be a wonderful thing, I don't know how thrilled I'd be about ERP blogs if I were CIO.

ILLUSTRATION BY PHILIP ANDERSON

Curious, I pinged a few of those Fortune 500 friends. To my astonishment, I discovered that while internal IT blogs may not be commonplace, they're not exactly rare. Though utterly unscientific, my informal queries found several major companies allowing blogs to coordinate and annotate project status information. At least one global IT consultancy has a rather witty blogger—I can't find out if it's approved or not—whose work is apparently required reading for his associates. The blog's hotlinks to internal reports, presentations and client reviews are reportedly first-rate.

Another internal blog at a huge financial services company can't possibly be authorized. But apparently, its mix of critical comments is seen as more constructive than not. I'm told that the CIO is an occasional reader and has informed subordinates that it serves as a reality check—for now.

Drawing distinctions between authorized internal blogs ver-

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sus ones that are merely allowed or tolerated can't be easy. I'd be comfortable making a case that companies are completely entitled to ban individual blogs as surely as they ban inappropriate personal e-mails.

That said, the blogging phenomenon has intriguingly useful implications for IT. I have to ask myself: Why *wouldn't* it make sense for an IT project manager to post a blog—or "plog" (project log)—to keep her team and its constituents up-to-date on project issues and concerns? Is it inherently inappropriate for an individual to post constructive observations about a project's progress? IT organizations that can effectively use blogs as managerial tools (or communication resources) are probably development environments that take both people and their ideas seriously.

Indeed, most of us so loathe traditional IT's "mushroom management" techniques (keep them in the dark and throw manure on them) that the notion of plogs that either complement or supplement more formal communication has a certain appeal. Whether management should explicitly encourage, authorize, endorse or simply allow plogs to emerge is a judgment call best left up to the culture of the company and character of the individuals.

IT organizations that can effectively use blogs as managerial tools (or communication resources) are probably development environments that take both people and their ideas seriously.

Frankly, if I were involved in an ERP rollout, I would be genuinely interested in accessing the blog of a user who actually had to cope with the implementation. His comments would likely have a salutary effect on me. Similarly, if I'm a sales manager at a pharmaceutical giant, I would be interested in occasionally browsing the blog of my IT counterpart who's installing the sales-force automation system. To be sure, I'm motivated more by curiosity than by the lust to interfere. But I've always liked the idea of relatively painless ways to get up to speed on issues. Plogs seem ideally designed to permit that.

Share Your Opinion

Michael Schrage says internal Web logs, or "plogs" (project logs), could be the best thing to happen to project management. But plogs' open and informal nature bears dangers too. What do you think? Go online to post your reactions in the **ADD A COMMENT** box at the end of this article.

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From a managerial perspective, I can hardly think of a better way to get new members of an IT team contextually grounded than to give them plogs to peruse, rather than make them read the outdated project sheets or suffer through a hasty luncheon debrief by the current project leadership. Of course, that's contingent upon the quality of the plog—but then again, the utility of virtually all management tools ultimately depends on their quality.

It's easy to imagine, for example, that plogs discoursing on coding and testing travails would be a wonderful resource for online documentation, FAQs and customer support. My own experiences browsing blogs-beyond-the-firewall has been that, for all their idiosyncrasies, they represent a pleasantly efficient way to review past events.

Yes, "blogorrhea"—the unedited stream-of-consciousness blather that afflicts so many bloggers—is a genuine risk. Experience teaches that there's a frighteningly thin line between self-expression and self-indulgence. (Just ask my editor.) Many people find that the sort of temperament (and ego) that loves to blog does not always lend itself to either constructive criticism or healthy feedback. Bloggers are typically too fond of the perpendicular pronoun. Then again, there are managers who screw up performance reviews too. The medium doesn't have to be the message.

So plogs can and should be different from blogs. Different organizations have the opportunity—I would now say the obligation—to explore how best to marry this medium of expression with the insatiable need for better managing communication, coordination and collaboration with IT and its clients. Frankly, I think plogs—like project leadership—represent an investment in professional development. That is, if a developer or manager or customer support rep can produce plogs that attract interest, raise awareness and foment change—well, that's a skill that deserves recognition and reward.

Inevitably, companies will need to establish guidelines—legal, ethical, editorial and otherwise—about linking to plogs and who should be able to access them. Formalizing the informal is always risky. In fact, perhaps pushing for plog precepts may undermine the very openness and spontaneity that makes the idea seem so potentially powerful and appealing. But that's the nature of the organizational beast.

The simple truth is, many organizations may need plogs to discover their own simple truths about how well (or how poorly) their projects are going. Maybe plogs will be more successful as project communication media for departments outside of IT. Wouldn't that be ironic? That's the sort of emergent managerial phenomenon that somebody might well decide to launch a blog about. Any takers?

Michael Schrage is codirector of the MIT Media Lab's eMarkets Initiative. He can be reached at *schrage@media.mit.edu*.

Ming Tsai, IBM business strategist, retail industry

The waggly bee dance and the responsive enterprise.

Upon arriving back at the hive, a bee with pollen-coated legs does a waggly dance for her fellow bees. The thorax motions are actually a map drawn in the air, entomologists have suggested, indicating both the direction and the distance of the pollen source.

This is the kind of "sense-and-respond" behavior that defines on demand business — the kind that most companies can only dream about.

A sense-and-respond retail environment, for instance, would know every time its best customers entered the store. It would be able to respond to what each valued customer was shopping for that day and suggest appropriate cross- and up-sells. Products would be in stock, promotions would be relevant, sales associates would be experts, checkout would be instantaneous.

This is on demand business, waggling to show you where the money is.

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Life AFTER OUTSOURCING

BY MERIDITH LEVINSON

Reader ROI

- How to prepare your people for an outsourcing initiative
- What it's like to go from managing people to managing paper
- How outsourcing can affect your status within the enterprise

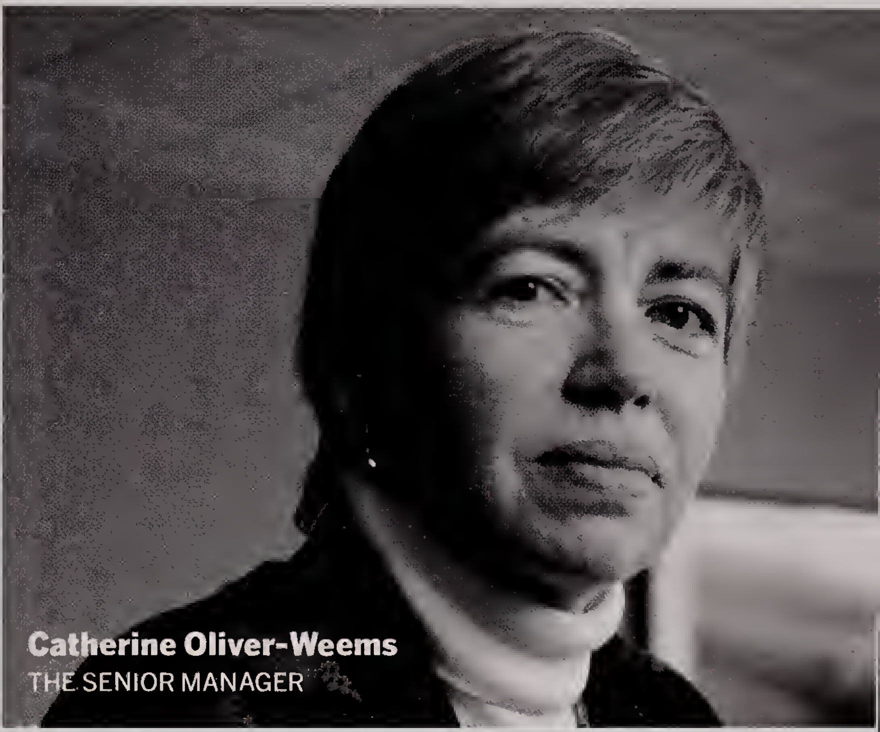
Shortly after Dick LeFave arrived at Nextel Communications in February 1999 as the company's new senior vice president and CIO, he concluded that Nextel could vastly improve its IT operations and its sagging bottom line (it had posted a $1.8 billion loss in 1998) if it outsourced a good portion of its IT. "The need here was to build a company that if [Nextel CEO] Tom Donohue wanted to press a button tomorrow and say, 'Hey, LeFave, we're going to grow this thing two or three times,' I didn't want to be standing in front of him saying, 'We can't scale.'"

LeFave had negotiated and led outsourcing arrangements for two of his previous employers, Southern New England Telephone and The Boston Co., a subsidiary of American Express. So he knew what he was getting into when, between 2000 and 2002, he signed long-term, big-money contracts with Amdocs to run Nextel's billing system (nine years, approximately $1 billion), with EDS to take over desktop and help desk support, network management and data center operations (five years, $234 million) and with IBM to manage Nextel's call center (eight years, $1 billion). He kept project management, application development and testing in-house.

What LeFave knew was that once he signed those contracts, his role would change, his department would change, and the lives of the 700 people working under him would change.

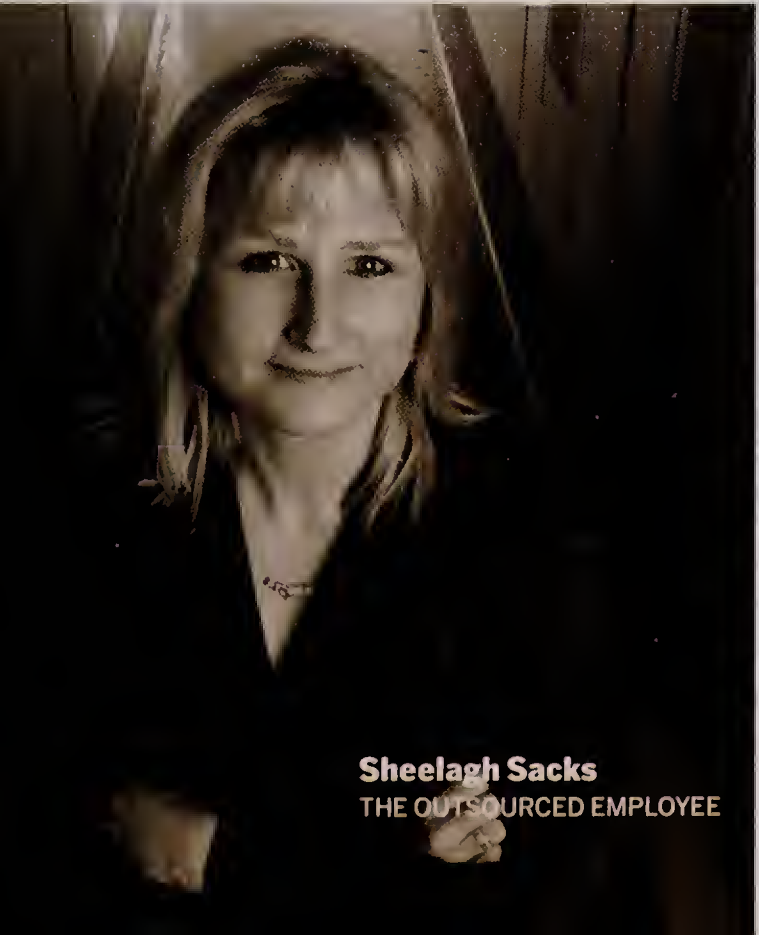
LEFAVE AND BRACE PHOTOS BY DRAKE SOREY.
OTHER PHOTOS BY STAN KAADY

Dick LeFave
THE CIO



Catherine Oliver-Weems
THE SENIOR MANAGER

The CIO. The VP. The Manager. The Outsourced Employee. We get up close with four characters in a life- and career-altering drama that's being played out at Nextel and in IT departments all over America.



Sheelagh Sacks
THE OUTSOURCED EMPLOYEE

Jerry Brace
THE VICE PRESIDENT

LeFave had no illusions. He knew shrinking the 285 Nextel workers in the IT operations department down to 20 wouldn't be pleasant. And he knew that he wasn't suddenly going to be free to spend more time fishing for flounder off the coast of Connecticut where his family vacationed. He knew his beeper would still go off every time a server went down, although it would no longer be his job to bring it back up again.

LeFave knew all this because he'd been through it before.

But maybe you haven't.

Right now, many CIOs are considering outsourcing significant chunks of their IT to cut costs, improve performance or obtain the scale their companies need to grow. Indeed, organizations around the world spent $180 billion on IT outsourcing in 2003, according to Meta Group, which predicts that this market will grow 10 percent within the next two years.

But despite the accrual of experience these numbers would suggest, the decision to outsource remains a difficult one. It has become a political issue, particularly when American jobs are sent overseas. (For more on the politics of outsourcing, see "Backlash" at *www.cio.com/printlinks.*) It alters the relationships between managers and employees, and between business and technology executives.

CIO Dick LeFave believes that Nextel's outsourcing deals have taken the burden of day-to-day operations off his shoulders and allowed him to focus on "running IT like a business."

To help CIOs make their outsourcing decisions—and to prepare them for the consequences—*CIO* spoke with Nextel's LeFave, one of LeFave's vice presidents, one of his senior managers and a former Nextel employee who was transferred to EDS when the deal was signed.

It turns out that they were prepared for some things, but not for others.

THE CIO

Outsourcing changes everything

The people. LeFave doesn't characterize himself as a touchy-feely guy. And standing more than six-feet tall, the portly, poker-faced former U.S. Army captain doesn't look like one either. But to ensure that his staffers didn't freak out over the outsourcing deal with EDS and begin abandoning ship, he had to exercise his sensitive side. LeFave needed as many Nextel people as possible to agree to move to EDS in order to make the deal work. If too many workers leave in the midst or aftermath of an outsourcing deal, the company and the outsourcer both suffer a damaging knowledge drain.

From the get-go, LeFave believed that honesty was his best policy. As the contract with EDS took shape during the fall of 2001, communicating the progress of the deal to his staff and addressing their concerns became one of his top priorities. To that end, LeFave offered his staff regular updates via e-mail and in meetings. He explained why he thought outsourcing would open doors for them, and outlined the reasons why the company was interested in pursuing it. He welcomed everyone from first-year desktop support personnel to senior-level directors into his office when they came looking for career advice. And in those private meetings he did his best to explain the benefits he thought they'd see from the EDS deal. He asked them, if you're going to be in data center operations, don't you want to work for a company whose reason for being is data center work? He told them they'd have more opportunities for training, professional development and advancement if they went to work for

One Thing Outsourcing **Doesn't** Change

What you owe your boss and company

> "All the basic metrics I've used in the past to test both quality and cost are the same ones we use now and the same ones I expect Dick to deliver. It's just that he does so in a different way."
>
> –NEXTEL COO TOM KELLY, CIO DICK LEFAVE'S BOSS

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EDS. One of the main reasons he chose EDS, he told them, was because it connected workers in transition with EDS employees who'd come to the company the same way in order to discuss the pros and cons of the transition. And EDS, LeFave felt, wasn't going to bring people on board just to dump them later.

In fact, the majority of the 290 people who moved from his IT department over to EDS remained on the Nextel account after a full year.

The culture. In addition to dealing squarely with HR issues, outsourcing has forced LeFave to become more culturally savvy. One of his outsourcing partners, Amdocs, has a significant portion of its operations based in Israel. For the relationship to work, LeFave had to learn what makes Israelis tick, and then he had to share that understanding with his direct reports and staffers. He's come to appreciate—through quarterly trips to Israel and by pulling all-nighters with Amdocs employees during Nextel's extensive billing conversion four years ago—that what drives them is pride in their discipline and grit. That pride, which developed in a society in which everyone serves in the army, can be misconstrued by Americans as arrogance, especially when contrasted with Americans' casual workstyle.

As an armed forces veteran, LeFave could relate. He counsels those staffers who work with Amdocs to be extremely definitive about the work they want Amdocs to do because Israelis, LeFave has found, are militarily precise about following orders. They won't interpret.

The job. With about 60 percent of Nextel's IT outsourced, LeFave no longer snaps into crisis mode whenever a server goes down. His beeper goes off, but EDS handles it. He gets daily reports on IT performance and regular reports on how his outsourcer is meeting service-level agreements. Once a month, during an executive steering committee meeting, he reviews each of his outsourcing agreements.

Because LeFave is no longer consumed by such tactical issues as malfunctioning servers, he says he spends his time "running IT like a business," which means identifying ways to drive as much cost as possible out of the IT infrastructure, managing IT investments, and meeting with business executives to understand their needs so that he can develop applications to support their goals.

Tom Kelly, Nextel's COO and LeFave's boss, sees the change in LeFave's role as operational, not strategic. "Dick today manages Amdocs and EDS to provide the services we need as opposed to managing lots of different departments that did a lot of individual things," he says. That said, Kelly doesn't evaluate LeFave's performance any differently. "All the basic metrics I've used in the past to test both quality and cost are the same ones we use now and [the same ones] I expect Dick to deliver. It's just that he does so in a different way," he says.

"At the end of the day," says LeFave, "if I can ratchet out money and provide an organization that's more effective and more capable and more scalable, that's a home run for me."

Customer Billing Services VP Jerry Brace used to be "head down," making changes as the business units requested. Now he needs to consider the companywide impact of those changes.

THE VICE PRESIDENT

More the businessman, less the technologist

Outsourcing doesn't necessarily minimize responsibilities or eliminate roles. No one understands that better than Jerry Brace, Nextel's vice president of customer billing services, whose department and role have grown since Nextel expanded its outsourcing relationship with Amdocs in 2000. At the time, Nextel contracted with Amdocs to lead the conversion of Nextel's decrepit billing system into an integrated platform called Ensemble and to provide day-to-day technical support in addition to producing bills. "Amdocs is really the arms and legs of the billing function," says Brace.

When Brace joined Nextel four and a half years ago as its senior director of IT billing, he led a group of 20 technical workers. They wrote the code that supported the billing system and did the troubleshooting when the system went down. They took orders from Nextel's business units. For example, when marketing announced changes in cellular rates, Brace's group implemented those rate changes in billing. Today, he says, Amdocs makes the changes, and he and his staff make sure Amdocs does so according to the service levels set out in the outsourcing agreement. He also now manages a 330-person organization consisting of several functions, including provisioning, messaging, returned mail and data management.

Senior Manager Catherine Oliver-Weems used to manage 70 people. Now she has only three direct reports. She's had to step back and let "the birds fly to their new nest."

Because with Ensemble Nextel got a much more integrated customer care and billing platform, and because Amdocs took over the nuts and bolts of support and maintenance, Brace and his team can now focus on big-picture issues such as improving customer service. And because the new platform is integrated, they've had to become more sensitive to how changes will affect other business functions. For example, changes to wireless rates usually generate calls from people who are surprised or who want to switch to a different plan as a result. So Brace now works with the marketing, finance, equipment pricing, collections and customer care groups to develop strategies for minimizing the negative consequences of rate changes.

"In the past, we would simply be heads-down, making a change based on a single request," says Brace. Now, potential problems are worked out ahead of time.

Since so many of the services Brace's group provides to both internal and external customers are enabled by third parties, Brace needs to ensure that those suppliers are meeting his customers' needs. To that end, he recently organized a two-day convocation of all the providers delivering services to Nextel's cash and collections group. The goal of the meeting was to communicate what cash and collections wanted and to identify how suppliers could better address its pain points, such as having to rejigger its operations every time its interactive voice response unit (which takes and routes calls from customers) goes down and has to deal with the subsequent backlog of work.

Even though many of Brace's old responsibilities have been outsourced, his salary is higher today than it was before the outsourcing deals. He says he finds his current role more satisfying than his old one because it allows him to be more the businessman and less the technologist, and because his people now understand the larger role they play inside Nextel.

"Everyone knows that at the end of the day, the work they're doing isn't about that one table change but about the 10 people that one table change affects," he says. "There's more gratification in knowing that we're meeting customer needs."

THE MANAGER

From managing people to managing paper

When Catherine Oliver-Weems, senior manager in IT operations for outsource vendor management, describes how her role as Nextel's help desk and network operations manager changed post-EDS, she says she's "looking at the same coin from a different angle." In other words, she still oversees those two functions, but the way she operates is considerably different.

Prior to the outsourcing agreement Nextel signed with EDS in January 2002, Oliver-Weems managed as many as 70 people across the help desk and network operations center. It was the six-year Nextel veteran's job to make sure that the help desk was properly staffed and met its obligations to the business. She coached and motivated her team. She had direct oversight.

Today, she has only three direct reports. Most of the people who used to work for her moved over to EDS. Instead of directly overseeing functions and the people who carry them out, she manages a relationship with a vendor. She makes sure EDS is meeting the service levels it committed to by studying the letter of the contract and comparing it to reports that measure actual service levels.

Peter Campbell, Nextel's senior director of IT operations and Oliver-Weems's boss, says the change from managing people to managing paper has been significant. "A lot of my folks used to be the people everyone went to when there was trouble," he says. "They'd jump in and get involved on the floor." That doesn't happen as often these days. Campbell adds that his direct reports in IT operations have more of a business focus today because they're so attuned to service levels and the costs of providing IT services to the company.

Oliver-Weems also serves as liaison between her end users and EDS. For example, last fall Nextel was preparing to comply with new FCC regulations that require wireless companies to let customers switch carriers without having to change their phone numbers and to move the number associated with a wireline phone to a mobile phone. Oliver-Weems connected Nextel employees with those EDS employees helping provide Nextel with the systems and connectivity it needed to support the FCC ruling. She made sure that EDS understood the goals and scope of the portability project, and that it had the documentation it needed to properly configure the systems.

Oliver-Weems says all that was a challenging adjustment. The hardest part was letting go of the team she had built, her "little chickadees," as she puts it.

"I had to do a certain amount of stepping back to let the birds fly to their new nest," she says in a slight Southern drawl. She also had to get used to the fact that she was no longer in charge of the people who fixed the network when it broke and could no longer go directly to them when a system went down. She says that after the agreement with EDS went into play and an outage occurred, she had to stop herself from running around the office looking for the coordinator who took care of such mission-critical problems.

"It wasn't that I couldn't directly go to those folks and speak to them or give them direction, but I had to remember that it was best to speak with [EDS] management and let them manage their staff rather than my continuing to go to the staff myself," she says. "It's my job to manage EDS and to make sure *they* do the job. It's not my job to do the job itself.

"For the most part," she continues, "I've managed to transition. I needed to step back and let them do their job. That's more of a statement about myself than it is about EDS."

Manager Sheelagh Sacks used to work for Nextel. Now she works for EDS. And although she still interacts with her old Nextel colleagues, her relationship with them has changed.

THE OUTSOURCED EMPLOYEE

Suddenly, you're the vendor

Sheelagh Sacks, manager of service delivery for data centers, worked for Nextel for eight years before she was transferred to EDS in February 2002.

Nextel's Outsourcing Deals

Between 2000 and 2002, Nextel signed three major outsourcing agreements with three different vendors

PROVIDER	WHAT THEY DO	LENGTH OF CONTRACT	VALUE OF CONTRACT	EMPLOYEES TRANSITIONED	RESULT
AMDOCS	Take over support for billing operations	9 years	Approx. $1 billion	Zero	20 percent reduction in infrastructure costs
IBM	Manage and update customer care centers	8 years	$1 billion	About 4,500	$1 billion cost reduction forecasted over eight years
EDS	Manage data center, help desk and desktop services	5 years	$234 million	290	$140 million reduction in IT costs expected over five years

SOURCE: Nextel

Although her paycheck now comes from EDS, she still lives and breathes Nextel. She sits at the same desk she sat at as Nextel's director of data center operations, and she works with many of the same people who worked for her when they were all Nextel employees. Even her base salary has stayed the same.

All those things have helped ease her transition. But still, it hasn't been easy.

In her new role, Sacks has a wider range of responsibilities. At Nextel, she focused on managing the 28 individuals in data center operations and alerted the rest of the company when things went wrong. Today, she oversees the 25 EDS employees who build the hardware, install the operating systems, load the databases and manage crises, as well as the client-support representatives who coordinate projects that deliver new systems to Nextel. While most of the individuals in these functions don't report directly to her, Sacks is responsible for making sure they deliver their services according to the contract.

And while she still works with Nextel employees such as Catherine Oliver-Weems, her relationship with them has changed.

"The people who were your buddies yesterday are still your buddies, but you have a different sort of relationship with them because now you're the vendor," she says. You don't suddenly become a pariah, she says, but you're no longer privy to corporate information that Nextel considers privileged. You're no longer on the inside; you're on the outside. And after devoting almost a decade to Nextel, that's hard.

Working for EDS, a company with 138,000 employees as opposed to Nextel's 17,000, Sacks says she feels like the proverbial small fish in the big pond. But she can see that there are opportunities in that big pond that would not have been available to her at Nextel. For one, when she needs to add an extra person to support an implementation or handle an outage, she has a huge pool of candidates from which to draw. By contrast, when she needed extra resources at Nextel, she often had to hire externally, which was much more time-consuming.

She says the other advantage to working for an IT services company is that when she encounters a new problem, "I have a wealth of knowledge to draw upon here that I really didn't have at Nextel. If I'm trying to figure out how best to deliver a service for Nextel, I can draw on a network of people supporting other accounts at EDS."

Sacks, who values stability in her life, doesn't work on any account other than Nextel's. And she believes that as long as Nextel is content with the work she's doing, that's the way it will be. "I don't think EDS jerks people around from one account to another unless that's what you want or unless something goes badly with the relationship," she says.

THE UPSIDE

The IT outsourcing decision seems to have worked well for Nextel. IT costs as a percentage of revenue have dropped from 8 percent to 4.5 percent. The billing conversion and outsourcing of support for the billing function to Amdocs has led to a reduction in bad debt. And the company has improved its customer service ranking by J.D. Power and Associates by six points during 2003 due to improved administration of bills and a more efficient call center operation.

While much of CIO LeFave's operations group—the function most closely associated with the CIO—has been outsourced, he doesn't feel any diminution of his status within the company.

"It's not about size," LeFave says. "It's about value." CIO

Senior Writer Meridith Levinson can be reached at *mlevinson@cio.com*.

Talk to Dick LeFave

Nextel CIO Dick LeFave knows how to downsize with dignity and acclimate his employees to an outsourcing culture. If you've got a question on outsourcing, he's got the answer. Catch him online until May 31 in this issue's **ASK THE SOURCE**. Go to **www.cio.com/experts**.

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To run actuarial applications for financial projections, GE Financial Assurance CIO **DEBORA HORVATH** linked 100 desktop machines, replacing a farm of 10 dedicated servers. Now those servers have been turned off, and performance has improved tenfold.

PHOTO BY DRAKE SOREY

TRUE GRID

Long the domain of scientists and engineers, grid computing is finally going mainstream. CIOs need to examine their applications to see if their businesses can benefit from grid's power and economies.

BY CHRISTOPHER LINDQUIST

Reader ROI

- Which applications can be grid-enabled, and which cannot
- How to prepare users for the grid environment
- What impediments to widespread adoption remain

DERIVATIVES CAN BE A MAGIC WAND FOR MONEY MANAGERS. USED PROPERLY, THESE COMPLEX FINANCIAL CONTRACTS help maintain profits by keeping a handle on risk. But pricing them is the key.

For derivative sellers like Wachovia, assessing risk and pricing isn't magic; the software that modeled its derivatives, grinding out the numbers, was complicated and needed to run thousands of what-if scenarios to determine end-of-day prices and to calculate the risk position for the derivatives portfolio. Locked into large, multiprocessor Unix boxes, the risk position calculation could take as long as nine hours. And throwing upgraded hardware at the problem wasn't going to help much. "It would have cut the time from nine hours to four and a half hours," says Mark Cates, chief technology officer for Wachovia's Corporate and Investment Banking group. "We needed it to run in under an hour."

The solution wasn't pricey hardware; it was cheaper hardware. Wachovia linked hundreds of already-deployed desktop computers into a grid, taking advantage of every machine with available processing time. The results were stunning. A job that used to take all day or overnight could now be completed in under an hour, allowing Wachovia to make exponentially faster risk and pricing decisions.

YOUR GRID GLOSSARY

Clustering: Collections of machines in a fixed configuration designed to operate and be managed as a single machine. Differs from grid computing where resources can enter and leave the pool as necessary.

Distributed computing: Connecting computing resources over a network for the purpose of consolidating CPU power. Grew out of a need for scientific and technical users to increase their processing power on limited budgets.

Grid computing: Connecting storage and data as well as CPUs from multiple systems into a centrally managed but flexible computing environment. True grid provides distributed resource management of heterogeneous systems.

Utility computing: One of a variety of marketing phrases (others include autonomous computing, computing-on-demand, adaptive enterprise) that describe business models for letting customers retrieve computing resources as necessary. Grid is the underlying technology for all of those models. *–C.L.*

Cates says that the grid solution cost Wachovia a fraction of what it would have cost to upgrade the large Unix environment—an upgrade that wouldn't have produced anything like the same performance benefit. "We're seeing ten- to twentyfold processing increases at 25 percent of the cost," he says.

Wachovia isn't bleeding edge. Thanks to improvements in both hardware and software, numerous companies have begun taking advantage of grid tools. Business users, particularly in the financial services industry, are seeing the benefits of grid in faster responses, reduced time to market for new products, and lower prices per unit of computing horsepower. There are still hurdles to vault before grid goes mainstream (right now, many apps simply don't make the transition), but grid is no longer just a tool for techies decoding the genome or designing airplane wings.

THE DIFFERENCE BETWEEN A GRID AND A CLUSTER

The technology behind grid isn't new. Its roots lie in early distributed computing projects that date back to the 1980s, where scientists would connect multiple workstations to let complex math problems or software compilations take advantage of idle CPUs, dramatically shortening processing times. For years, vendors and IT departments eyed this opportunity to dramatically increase processing power by employing existing resources. But only recently have the tools arrived to put general business applications to work on a grid.

As a result, grid has become a centerpiece of the "utility computing" marketing drive taken up by nearly every vendor. Load balancers, clustering solutions, blade servers—just about any product can come to market with a grid label. But that hype doesn't mean it's grid.

"When I first started covering grids two and a half years ago, Sun had defined grids as including clusters," says Joe Clabby, president of technology research company Clabby Analytics and author of a recent report on the state of grid. By that definition, Sun would have had more than 5,000 grids. But while grids and clustering both share resources across multiple machines, grids, according to Clabby, are different because they allow "distributed resource management of heterogeneous systems." In other words, with grids you can quickly add and subtract systems—without regard for location, operating system or normal purpose—as needs dictate. Clusters are built from the ground up to function as a single pool of compute power and consequently aren't as flexible.

Learn More About Leading Change

Getting pushback when you want to move into new areas like grid computing? Former CIO and consultant Charlie Feld offers advice on how to lead your organization through technological change. Go to **www.cio.com/printlinks**.

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THE SCALE'S THE THING

Scaling is one of grid's primary benefits to the enterprise. With properly designed grid-enabled applications, grid can produce staggering performance improvements—add a new processor and get that processor's full power added to the mix. Using grid math, you can add two or more cheaper, slower processors to achieve far greater power than you could with a much more expensive high-end machine. String enough processors together, you can even exceed the number-crunching power of some supercomputers.

Scalability at an affordable price was the key to grid for Acxiom, a company that specializes in cleaning and integrating customer data. Acxiom, for example, can determine if Bob A. Smith and R. Albert Smith in Los Angeles are the same person and, if so, consolidate his customer data into a single record. This is a critical task for marketers looking to maximize the effectiveness of their campaigns, but it takes massive amounts of processing power.

Acxiom's "link append engine," called AbiliTec, takes name and address information and uses it to create links to databases, and it does this a lot: 15,000 links every second, 24/7, according to C. Alex Dietz, products leader at Acxiom. "It's a perfect application for grid computing," Dietz says. "Take one name and address and feed it to the appropriate grid node. In parallel, feed the next name and address to another grid node."

But when Acxiom started integrating AbiliTec into all of its services, the company discovered that the original architecture—based on multi-CPU symmetric multiprocessing machines—wouldn't scale sufficiently to handle the load. Acxiom then built the grid system from scratch using custom code (built around Ascential Software's Orchestrate framework for grid applications) and a bank of IBM blade servers that supply some 4,000 nodes for the grid. (For more on blade servers, see "The Inevitability of Blade" on Page 68.) The result has been the capacity to process 50 billion records a month. "We had to invent a way to take a raw name and address and go into a database and extract links extremely fast and extremely accurately," says Dietz. "We couldn't do it with traditional techniques."

Grid offers scalability in other ways as well. Alain Benoist, CIO for Debt Finance Société Générale Corporate and Investment Banking, says his group moved into grid late last year to help it more rapidly create new financial derivative products as well as to provide faster modeling of the company's market exposure (or "value at risk") for regulatory purposes. But for him, scalability also meant the chance to ease the transition from model to final product.

"The people who are developing the pricing models for derivatives are not people who would feel at home on a supercomputer," Benoist says. Instead, they develop the derivative models using PC-based tools such as spreadsheets. The models are then implemented in common PC programming languages and tested. The ones that pass muster can then be integrated into production applications that can be run on the grid.

But for many companies, scalability and processing power are only half the grid equation. The other half is finding ways to take better advantage of the equipment you already have.

HOW YOUR PCs CAN BE ALL THAT THEY CAN BE

Estimates vary, but the average desktop PC is actually doing something worthwhile less than 20 percent of the time. Some estimates go as low as 5 percent. Yet companies still feel compelled to buy new server hardware capable of dealing not with the average load but with the spikes. Grid promises to solve that problem by putting those idle CPUs to use 40 percent, 50 percent or even 80 percent of the time. And Sunil Joshi, vice president of software technologies and computer resources at Sun Microsystems, claims 98 percent utilization.

Joshi doesn't claim that achieving this degree of efficiency is easy, but he does say that through years of practice, his group, which manages computing resources for SPARC processor design at Sun, has turned the maximization of some 10,000 grid-enabled CPUs into a "fine art." His group even plans the timing of bringing machines down for routine maintenance to minimize any negative utilization impact.

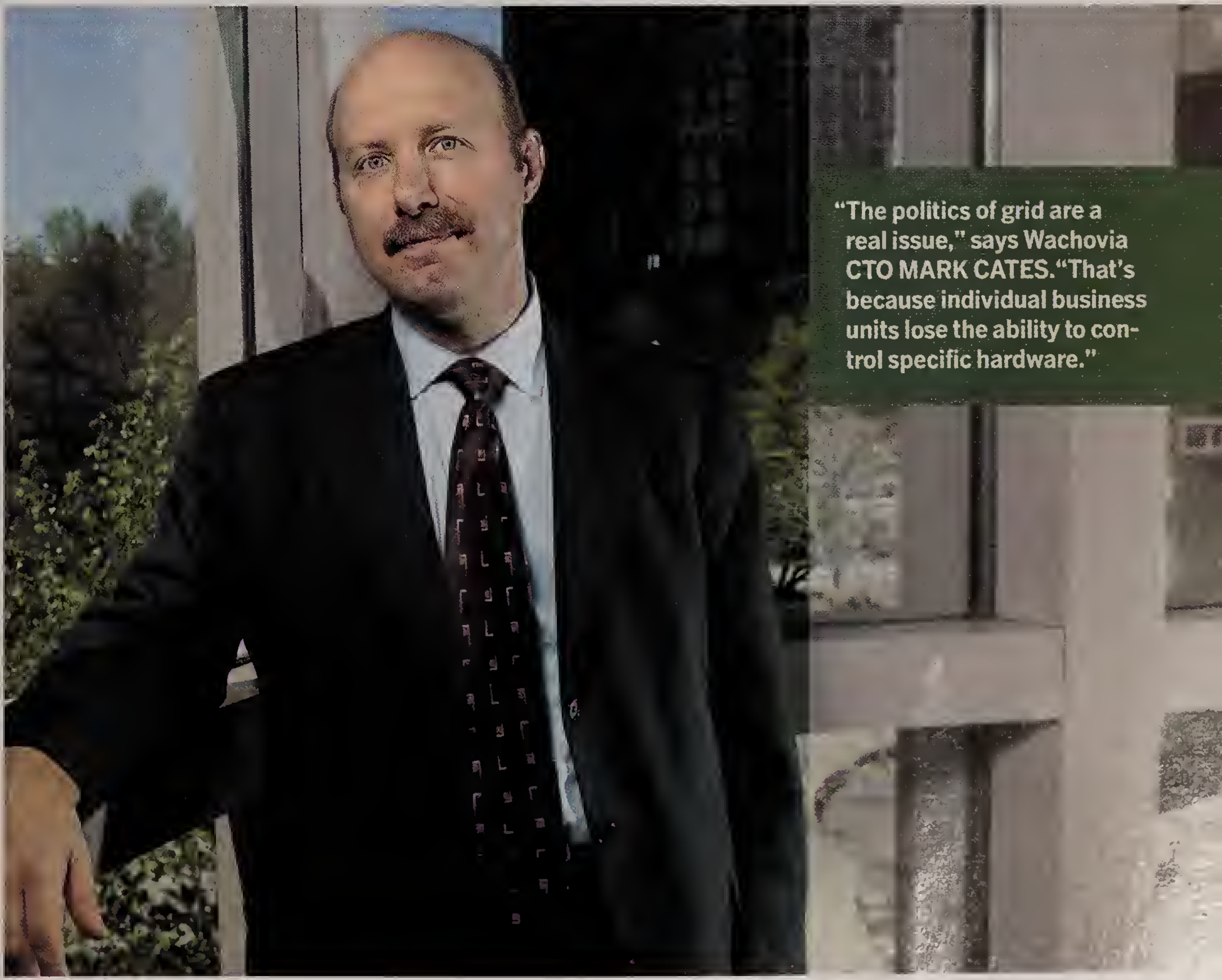
Joshi has an advantage in that many engineering applications have been grid-enabled for years. As a result, his group can tune what applications run where to take maximum advantage of every machine. For instance, a machine could run one application that handles a lot of input and output (I/O) for a database while another, more computation-intensive application hammers the same system's CPU. The goal is to have enough types of applications—high priority and low, CPU-intensive and I/O-intensive—to fill every unused gap, no matter how small, in every grid-connected computer.

Of course, most CIOs would be happy achieving much more modest utilization rates.

"The shortest and best route to getting more utilization, better capacity, is with something like grid," says Philip Cushmaro, CIO and managing director at Credit Suisse First Boston (CSFB).

Cushmaro's organization began using grid computing back in 1999 for overnight batch jobs, work that wasn't particularly time-sensitive and could make good use of otherwise wasted CPU cycles. But as technology improved, CSFB began moving other applications to grid, including critical financial risk management tools. And Cushmaro says the company will investigate other uses for grid. "When everybody goes home at night, all our desktops are doing nothing," he says. "Wouldn't it be nice if we could use those?"

Grid expansion is also on the mind of Debora Horvath, senior vice president and CIO at GE Financial Assurance. Last August, her group began using a grid to run actuarial applications to make financial projections. These computations used to take as long as a day to run a job on a farm of 10 dedicated servers. But by linking 100 desktops (using DataSynapse software) and simply grabbing idle time on the machines, GE Financial Assurance was able to realize performance gains of 10 times over the dedicated (and now turned off) servers without end users noticing anything but the faster response times. Horvath is so happy with the results that her group is



"The politics of grid are a real issue," says Wachovia CTO MARK CATES. "That's because individual business units lose the ability to control specific hardware."

PHOTO BY BOB RIVES

already examining new applications that could take advantage of grid. “We have enough other compute-intensive work that we can continue to use grid again and again and again,” she says.

WHAT TO SAY TO THE SERVER HUGGERS

Even with the economies of grid showing promise (including performance gains and the opportunity to take advantage of existing systems rather than buying new hardware), there are still roadblocks to widespread adoption, user resistance among them.

“Whenever you take a significantly different technology to your customers, they may be skeptical,” says Horvath. “When we told people we were going to take away the dedicated servers and use their PCs, there were skeptics. But after we did a pilot, they were won over.”

Most days, the bulk of the world’s computers do little more than keep their disk drives warm while bouncing a Windows logo around the screen. **Estimates vary, but the average desktop PC is actually doing something worthwhile less than 20 percent of the time.** Some estimates go as low as 5 percent.

In fact, according to Kevin Gordon, GE Financial Assurance’s vice president for IT, new technology and business development, turning the naysayers around took less than half an hour. “We had the actuaries in for a training session. And we took a job that they’d run overnight, and we started it at the beginning of the training session, and within 20 minutes, before the training was over, we had the job completed,” he says.

“Now [those skeptics] are our strongest advocates,” adds Horvath.

It won’t always be so easy to convert the masses, however. “In these worlds inside an organization, you have very siloed resources,” says Ian Baird, chief business architect and vice president of marketing at grid software maker Platform Computing. “They’re server huggers. They don’t want to let go of their resources,” fearing that sharing will result in loss of control and reductions in departmental budgets as servers disappear and computing resource management becomes centralized. Often, people confronted by grid worry that their status will suffer or that their data’s security, swimming around in the grid, will be compromised.

Baird says CIOs need to communicate to managers and users that with grid management, software jobs can be prioritized to make sure everyone gets their fair share of resources. Grid security systems can ensure that data doesn’t fall into the wrong hands, even when the data runs on a variety of dispersed PCs. And users won’t suddenly find their PCs locked up because somebody in engineering needs a bit more computing horsepower.

“The politics of grid are a real issue,” says Wachovia’s Cates. “I believe that’s primarily because individual business units lose the ability to control specific hardware.” But, he adds, “as the grid approach is proven and use expands, we’re hoping the advantages will make that as much of a nonissue as possible.”

STANDARDS, PRICING AND OTHER GRID HURDLES

Creating tools that work in distributed, heterogeneous environments is a field ripe for standards, something both grid vendors and customers realize. “Obviously,” says Société Générale’s Benoist, “if you want to change your applications and move them, you feel better in an open standard world,” where applications can work with a variety of grid management software instead of being tied to a single vendor.

Understanding that concern, vendors and researchers are involved in several standards bodies. Key among those are the Global Grid Forum (GGF), the Enterprise Grid Alliance (EGA) and the Globus Alliance. The GGF—whose members include Ascential, DataSynapse, Hewlett-Packard, IBM, Microsoft, Oracle, Platform Computing and Sun—works to develop standards intended to create a wide range of interoperable grid-computing environments and applications. The EGA—formally announced in April by Oracle, HP, Sun and others (though notably not Microsoft, IBM or Platform Computing)—has set goals of providing standards aimed at grid-enabled enterprise applications—what it claims will be a subset of the GGF’s work. Globus was formed by a group of research organizations, including Argonne National Laboratory and the University of Chicago and sponsored by the Defense Advanced Research Projects Agency and the National Science Foundation. The group implements standards through its Globus Toolkit, an open-source development suite that lets software makers jump-start their grid development. Current standards include the Open Grid Services Architecture (OGSA), the Open Grid Services Infrastructure (OGSI) and—most recently—the Web Services Resource Framework, which will supplant OGSI later this year, according to GGF, and allow grid software makers to use common Web services standards to identify and utilize grid-computing resources.

Other issues arise around licensing and pricing. Vendors who move their products to grid must figure out ways to price their software. Per-CPU or per-seat pricing often makes sense in a world where those numbers stay relatively static, but with grid, an application could run on 500 processors one minute and none the next. Being charged for every one of those processors could drive much of the cost benefit out of grid for customers, but adopting a “buy it once, use it everywhere” model could push vendors out of the grid business. Ultimately, per-use price models—likely based on specifications supplied in the OGSA—could dominate, but the tools for tracking such usage have yet to be fully developed. “We believe that companies are going to have to change their business models and their attitudes for how

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But success had a price: its central IT department was spending too much time maintaining the large number of applications. What's more, their IT infrastructure was a dizzying mix of different application servers, development tools, and open source components.

Using SAP NetWeaver – and, more specifically, SAP Enterprise Portal and SAP Web Application Server – Check Point was able to immediately consolidate its Web services infrastructure, doubling central IT's application development productivity. Within a year and a half, Check Point saw an ROI of 586% based on IT productivity increases and swifter rollouts. The consolidation also allowed Check Point to reduce the number of servers running their Web service applications from 11 to 3. Over five years, Check Point expects a 23% reduction in TCO.

CARL ZEISS OPTICAL: EVOLVING BUSINESS PROCESSES TO MEET THE NEEDS OF A CHANGING MARKET.

Carl Zeiss, a leading optical component manufacturer with 14,000 employees, needed to find a way to evolve more quickly. Consolidation among optical chains was creating new, ever-larger customers, resulting in management scenarios of greater complexity and delays in order processing.

Using SAP NetWeaver, Carl Zeiss was able to integrate multiple systems around the needs of their customers, developing individual logistics strategies for each chain. As a result, custom orders and changes are now accommodated more easily. And the time it takes to integrate a new customer into the system has dramatically decreased.

Besides gaining more-satisfied customers, Carl Zeiss reduced the average cost per integration interface by 50%.

SASOL: FURTHER LEVERAGING THEIR SAP INVESTMENT.

Sasol, a holding company for nearly fifty separate chemical and fuel businesses around the world, had consolidated all of its core operational software around SAP. However, it still faced the challenge of properly managing a widely dispersed, and culturally diverse, workforce.

Using SAP NetWeaver, Sasol was able to create an enterprise-wide information portal for collaboration and communications between employees of different divisions, greatly increasing the company's ability to meet strategic corporate goals. The portal also served to coordinate business processes for HR, production planning, and production work flow across Sasol's various business units.

The financial results were impressive, with an ROI over five years, after tax, of 453%. But even more importantly, thanks to SAP NetWeaver, Sasol was able to become a truly global player.

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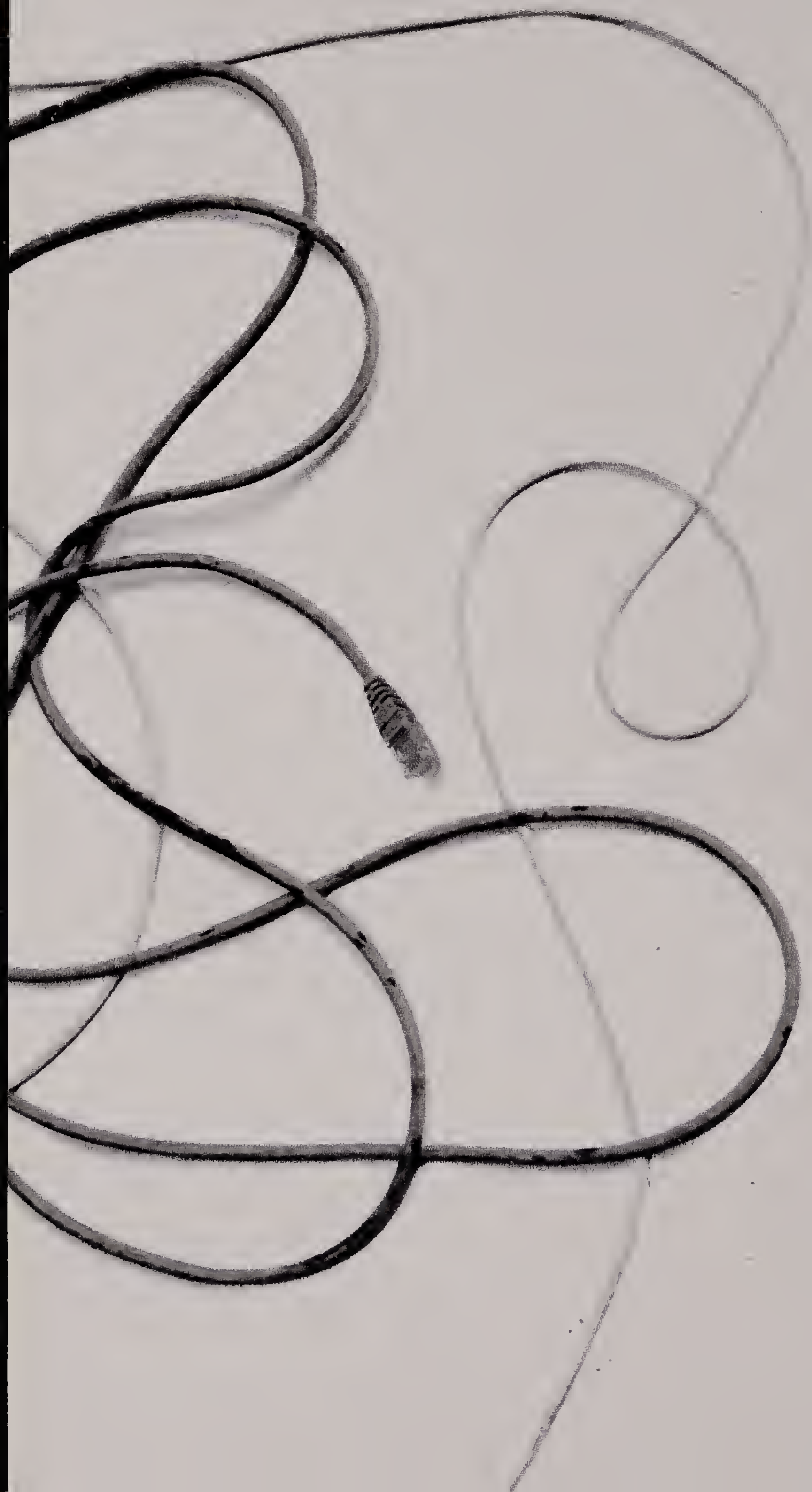
Feeling a bit skeptical these days? It's perfectly understandable. After all, integrating those "best of breed" applications into your IT infrastructure turned out to be not nearly as fast or foolproof as advertised. And capturing their full value, as well as the full value of your entire infrastructure, probably still seems like a distant goal.

Given the circumstances, you did everything you could. After all, you were handed the technological equivalent of a drawerful of mismatched socks – very expensive socks.

But now you can do more – actually, quite a lot more. Read on and find out how.



THE ACCELERATION OF EVOLUTION

Remember when it was okay for businesses to evolve slowly?

Of course you don't. Success has always been about speed: the speed of innovation, the speed of implementation. And it all just keeps getting faster.

Today, markets, customers and competitors change seemingly overnight. And so must your business processes and strategies.

Unfortunately, this rapid pace of change has exposed a fundamental weakness at many businesses: an IT infrastructure that can't evolve quickly enough to take advantage of opportunities or respond to challenges.

There are two reasons for the bottleneck. The first is complexity. By the time a new business process or strategy can be designed,

built, implemented and executed technologically, the window of opportunity has usually closed.

The second is monetary. Currently, 80% of the average IT budget is earmarked for operation and consolidation. Very little is left for innovation. *(Source: SoundView Technology Group, 2003.)*

Can your business afford to concede opportunities to more agile competitors? Of course not.

Your task is clear: to enable your company to compete and win, you have to reduce the complexity and cost of your IT infrastructure, and reallocate more of your resources toward innovation.

Fortunately, there's a technology platform that will enable you to fulfill that task. It's called SAP NetWeaver.™

But before we take a closer look at what makes SAP NetWeaver so useful, let's explore what contributes to a high, and skewed, overall TCO.

THE COMPLETE TCO EQUATION

The typical IT infrastructure is a jumble of disparate technologies (including portals, business intelligence, knowledge management, etc.) and applications (both legacy and best of breed).

Whether you're integrating your applications into a portal or a business intelligence solution, or connecting your apps with the integration broker, it's costing you time, money, and unnecessary aggravation.

To help illustrate just how much money, we're introducing a new, more complete way of identifying costs. It's called The Complete TCO Equation.

COMPLETE TCO =

the cost of all your technologies, including their integration into a single platform
+ the cost of all your applications, including their integration into an end-to-end process
+ the cost of integrating all your technologies with all your applications

From this point of view, it's no surprise that integration has been likened to a sinkhole, draining money from innovation and preventing your business processes and strategies from evolving as quickly as they need to.

But what if you could transform integration into a far simpler, less expensive, less painful process – no matter whose technology or applications you're integrating? Now you can – with SAP NetWeaver.

SAP NETWEAVER: ELIMINATING HURDLES, ENABLING IDEAS

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SAP NetWeaver is an open, standards-based integration and application platform that greatly reduces the complexities of integration. Its components include a portal, an application server, business intelligence, and integration and data consolidation technologies.

With SAP NetWeaver, you capture the full value of the technology you already have in place, and pave the way for future technology – SAP or non-SAP.

The result: an opportunity to achieve significantly greater flexibility at a far lower, sustainable TCO.

Bottlenecks disappear. Timetables are met. Business goals are achieved. Your entire IT architecture is elevated from an enabler of work into an enabler of change.

For current SAP customers, there's even more of an advantage: SAP NetWeaver comes pre-integrated for SAP® solutions, which greatly reduces the costs associated with systems integration.

But SAP customer or not, there's one thing that should be clear: of all the software providers in business today, SAP is uniquely positioned to deliver integrated technologies and technologies integrated with applications.

If that concept piques your interest, we suggest you visit **sap.com/netweaver** where, we hope, your curiosity will be integrated with our solutions.

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CIO | 05 The Year Ahead

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they license their products in a grid world," says Platform's Baird. "These apps are going to have to float around in the ether and not be fixed to a particular CPU or a particular seat. *Dynamic* is the key element here."

Grid can even introduce dilemmas for the bean counters. For instance, a CIO at one computer hardware maker says he would love to grid-enable thousands of machines as they go through the burn-in process at the company's manufacturing plants. The machines run various software for extended periods so that the quality assurance people can make sure no components are about to fail before the machine goes out the door. Why not, asks the CIO, run the company's grid-enabled software during the burn-in? "It would be like finding a new source of oil," he says. But the company's accountants can't decide how to describe a product that's been used, no matter how briefly, for work inside the manufacturer. Is it still new? Has it become a depreciable asset? So far, that gusher remains untapped.

IS GRID RIGHT FOR YOU?

Right now, many applications simply don't lend themselves to grid computing—especially those that depend more on data handling than CPU power, such as most accounting, CRM and ERP apps. Such applications often take a large chunk of data and run many functions on it, with each task depending upon the previous one. These applications will generally work better on a single processor machine.

The best candidates for grid are applications that run the same or similar computations on thousands or millions of pieces of data, with no single calculation dependent on those that came before. These so-called embarrassingly parallel applications—which include numerous scientific tools, cryptography, and the actuarial and derivative examples mentioned earlier—are ideal for grid, as they scale almost perfectly with the applications able to take advantage of every new processor you throw at them.

Grid standards will undoubtedly help in the effort to move more software to grid by providing a common framework on which applications can be built. And large software companies such as Oracle and SAP already either have products (Oracle 10g) or pilot programs (as SAP does) for grid-enabled applications in place. "Grid has kind of been like a science experiment until now," says Tony Scott, CTO at General Motors. "It's been not commercialized, not standardized, not accessible, not really supported in the classical IT environment." But Scott sees the entrance of Oracle and others as a sign that grid will begin to develop the support infrastructure required by enterprise IT tools: "We not only need the product itself, we need the manageability tools, we need the provisioning tools, we need all of the ecosystem it takes to support these things in our environment."

IT'S A GRID, GRID, GRID, GRID WORLD

Grid computing continues to evolve. Analysts and vendors now identify at least three types of grids. While most people think of computational grids, enterprises are looking into data grids that don't share computing power but instead provide a standardized way to swap data internally and externally for data mining and decision support (music sharing systems like LimeWire and Kazaa are examples). Collaborative grids, meanwhile, let dispersed users share and work together on extremely large data sets. (The NEESgrid, *www.neesgrid.org*, for example, allows earthquake researchers to share data and even research equipment as virtual teams over the Internet.) Clabby of Clabby Analytics also notes that subgenres such as utility grids, enterprise optimization grids and others continue to develop. In short, grid isn't going away.

Given that, it behooves CIOs to identify those business functions and applications that might benefit from being grid-enabled. As GE Financial Assurance's Horvath says, "I think it would be very difficult for a CIO to find a technology and an application that has the payback that [grid] does. The cost is so low and the benefits are so high that it can't be ignored." CIO

Technology Editor Christopher Lindquist can be reached at clindquist@cio.com.

IN THE GRID GAME

An assortment of grid players

Ascential (ascential.com): Enterprise Integration Platform that supports data integration grids.

Avaki (avaki.com): Avaki Data Grid creates a unified catalog of data across a network.

DataSynapse (datasynapse.com): GridServer lets customers move existing applications to grid environment.

Dell (dell.com): Partnered with Platform Computing (see below) to provide grid-enabled systems for CPU-intensive computing purposes.

Enterprise Grid Alliance (gridalliance.org): Group formed by Oracle, HP and others to create enterprise-oriented grid standards.

Global Grid Forum (ggf.org): Standards body that creates and publishes grid computing standards.

The Globus Alliance (globus.org): Group offers open-source development kits based on Global Grid Forum and Oasis. Will likely include other standards.

Hewlett-Packard (hp.com): Utility Data Center provides rapid reallocation of computing resources. Works on a variety of corporate grid products and services.

IBM (ibm.com/grid): Grid is a central part of IBM's autonomic computing model. Numerous products and partnerships in place.

Oracle (oracle.com/grid): Released Oracle 10g database early this year. Built-in support for grid computing resources.

Platform Computing (platform.com): Software that consolidates computing resources and provides an architecture for grid-enabled applications.

SAP (sap.com): Currently piloting a project to grid-enable SAP applications.

Sun Microsystems (sun.com): N1 Grid engine combines grid and clustering.

United Devices (ud.com): Offers enterprise grid software and hosting service for grid-on-demand. –C.L.

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Channel Integration

How REI scaled E-Commerce Mountain

REI demonstrates how its website functions as a sales channel that complements its physical stores

BY MEGAN SANTOSUS

When outdoor equipment retailer REI wanted to boost in-store sales, the company looked to its website. In June 2003, REI.com launched free in-store pickup for customers who ordered online. The logic behind that thinking: People who visit stores to collect their online purchases might be swayed to spend more money upon seeing the colorful displays of clothing, climbing gear, bikes and camping equipment.

REI's hunch paid off. "One out of every three people who buy something online will spend an additional $90 in the store when they come to pick something up," says Joan Broughton, REI's vice president of multichannel programs. That tendency translates into a healthy 1 percent increase in store sales.

As Broughton sees it, the mantra for any multichannel retailer should be "a sale is a sale is a sale—whether online, in stores or through catalogs." The Web is simply not an isolated channel with its own operational metrics or exclusive group of customers. As the Web has matured as a retail channel, consumers have turned to online shopping as an additional place to interact with a retailer rather than a replacement for existing channels such as stores or catalogs. According to Jupiter Research, while its online sales prediction for 2008 of $117 billion represents only 5 percent of total retail sales, the company estimates that 30 percent of offline sales will be influenced by the research that consumers conduct online. Essentially, that means retailers will need to leverage their online properties in ways that are synergistic and complementary to their offline operations.

Reader ROI

- How REI uses the Web to drive in-store sales
- How a website can complement your retail strategy

Adopting a complementary strategy means focusing on "the continuum of the shopping process," says Jeff Schueler, founder and CEO of Usability Sciences, an online usability-testing company. The Web has evolved to become an important part of the shopping continuum, and smart retailers such as REI have mixed IT and marketing to maximize its complementary role.

To effectively leverage the channel continuum, companies must pay close attention to why people are coming to their websites. Most shoppers, Schueler says, follow a predictable sequence of steps before they

PHOTO BY STEVEN VOTE

VP of Multichannel Programs Joan Broughton and IS VP Brad Brown: Their motto is "a sale is a sale is a sale—whether online, in stores or through catalogs."

make a purchase. Making a purchase is really the culmination of the shopping process. The first steps—information-gathering and price comparisons—are ideally suited for the Web. In fact, 86 percent of people go online to gather information, comparison shop, get coupons or conduct self-service tasks such as paying bills or checking the status of an order, according to Schueler. Only 14 percent go online to purchase. Any given website should therefore not be considered an endpoint for shopping.

At REI, a cooperative with 2 million members, many products for sports such as climbing, mountain biking and skiing are technical. Customers not only want to research before they buy, they want to try before they buy. To that end, REI views the website both as a sales channel and a driver to stores. Free in-store pickup for online orders is a strategy specifically designed to get people into the stores.

And to make that strategy as cost-efficient as possible, the company uses the same trucks that restock its stores to fulfill online orders slated for in-store pickup. To make this work, REI had to integrate order information from the website and replenishment orders from stores at its distribution warehouse in Washington state. REI.com uses IBM's Websphere e-business platform that runs on an RS/600 with an Oracle database that interfaces to an order-processing system. The AS/400-based order-processing system is used throughout REI, including the store replenishment process.

In and of itself, integrating the two types of order information wasn't complex, says Brad Brown, REI's vice president of information services. What was difficult, however, was coordinating fulfillment of both online and replenishment orders because "orders placed on the Web [by customers] are nothing like replenishment orders that stores place," he says. Online orders are picked from the warehouse at the time of the order and then put in a queue until the appropriate truck is loaded, whereas store orders are picked by an automated replenishment system that typically picks orders at one time based on either a weekly or biweekly replenishment schedule.

To make in-store pickup a reality, Brown's group wrote a "promise algorithm" that informs customers of a delivery date when they place an online order. Timing can get tricky when orders are placed the day before a truck is scheduled to depart the warehouse with a store-replenishment delivery. For example, if an online order is placed on a Monday night and a truck is scheduled to depart Tuesday morning, the system promises the customer a pickup date of a week later, as if the order would be placed on the following week's truck. However, REI will shoot for fulfilling the order that night; if it can do it, REI (and, ultimately, the customer) is happy because the order arrives sooner than was promised.

REI has also expanded its multichannel philosophy to include services. In February, the company launched an integrated gift registry that allows people to set up gift lists and enables Aunt Tillie, for example, to purchase requested items in any retail channel. The registry also allows consumers to post messages to other site visitors, seeking information or specific, hard-to-find products. Customers can create a gift registry in one of two ways: They can use a kiosk or scan products with a handheld device. They also have the option of registering for gifts by calling customer service or going through REI.com. Once a registry is set up, REI sends e-mails to a designated list of recipients, complete with a link to a personalized registry page. According to Brown, the registry is a way to expand sales among consumers who don't traditionally shop at REI.

Creating effective business-to-consumer retail websites entails more than simply calculating sales figures. It's about delivering the functionality that users expect and using the site to drive sales through other channels. And only IT integration can make this happen. CIO

Senior Editor Megan Santosus can be reached at santosus@cio.com.

Learn More About Integration Efforts

Bricks need clicks and clicks need bricks. A year and a half ago we wrote about **PIONEERING COMPANIES** trying to let customers order online and pick up at the store. Who were they, and how did they do? Read "Your Place or Mine?" at **www.cio.com/printlinks**.

CIO.com

Online Customer Service: The Basics

What every online retailer should provide its customers

When it comes to converting shoppers into buyers, a good customer experience is the number-one indicator. Unfortunately for retailers, there's no magic formula for ensuring a good experience. Consumer expectations vary widely depending on products; shoppers of commodities such as books and CDs tend to go online to buy a specific title, while those in the market for technical gear such as audio equipment are looking for product information and price comparisons.

Shoppers are fairly resilient when it comes to sporadic performance problems, says John Lovett, senior performance analyst with Gomez, an Internet performance company. "If a customer experiences slowness or a broken page once in awhile, they'll return to use that channel," he says. What shoppers can't tolerate is inconsistent performance, recurring navigation problems and unexpected mishaps, such as completing the order-entry process only to learn that the product won't ship on time.

In light of that, Kate Delhagen, vice president of retail research at Forrester Research, offers these basic elements that every retail website should include:

- Clear navigation that takes consumers to relevant products within a few clicks
- Product detail pages with all information needed to make a purchase, such as images, ratings, inventory status and so on
- Easy and intuitive checkout process
- Shipping and tax fees clearly displayed before credit card submission
- Order and shipment status tracking capabilities
- Follow-up e-mail after the expected shipping date

–M.S.

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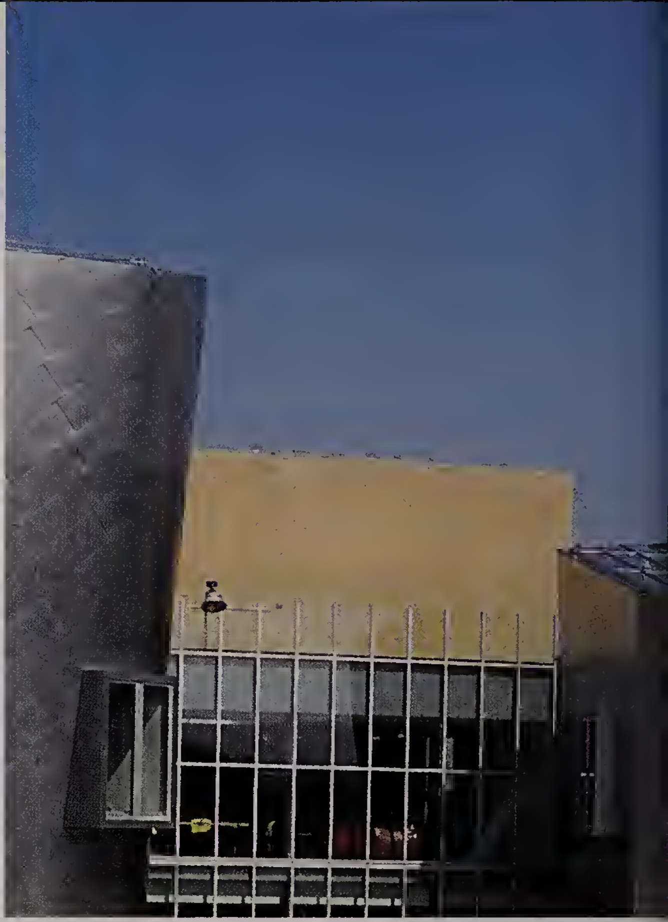

LEFT: The $285 million Stata Center looks like an architect's model come to life.

MIT BUILDS ITS DREAM HOUSE

The way computer scientists work—their strategies and goals—is changing. MIT's new Stata Center reflects that change, offering fresh ways of looking at networks, collaboration and even architecture.

BY FRED HAPGOOD

It's a few days before the big March move and Jack Costanza squats and touches the inside of a large black optical switch, a "collapse point" that will act more or less like a router. "See this?" he says, holding up his finger. There it was. A little white smudge of plaster dust. On the tip of the $100,000 switch, it would, according to Costanza, seriously compromise the equipment's performance. "This tells me I have a lot more shouting to do," he says.

Costanza is being facetious. He doesn't shout; he has a quiet, bemused air that says, in effect, "Problem? What problem?"

But problems abound. MIT's computer science labs are moving into a new building—the hypermodern, $285 million, 719,000-square-foot Ray and Maria Stata Center designed by architect Frank Gehry. And for the close to 1,000 teachers, students, researchers and support staff working in dozens of groups representing fields ranging from robotics to biological computing, the new building is drastically different from the only labs most of them have ever known. And hardly any of the solutions, relationships and customs of the past can be taken with them. Everything has to be made new, and all these new systems have to mesh.

Reader ROI

- How MIT's new workspace facilitates collaboration
- The network challenges posed by new styles of working
- How the Stata Center suggests a new engineering paradigm

PHOTOGRAPHY BY CHRISTOPHER HARTING

TOP: A view from 1945 of NE43, the old computer science lab where the Internet was born.
BOTTOM: A star building for MIT's star science. Metal sections bulge out between the Stata Center's brick walls.

As director of IT for the newly formed Computer Science and Artificial Intelligence Lab (CSAIL), Costanza owns a major piece of the move. Networks are mission-critical in any organization, but considering the nature of the CSAIL labs (ubiquitous computing, advanced network architectures, parallelized operating systems and more), given a choice between having the walls up or the network up, everybody here would pick the latter. After all, if a chilly wind blows, you can always wear a sweater. But if Costanza can't deliver a functional network on moving day, there's just no point in moving. And he's not going to be able to deliver if construction grit keeps drifting into his switches.

Of course, networks move all the time. But in this case the stakes are unusually high. Engineering has passed through two major intellectual renovations over the course of the past 150 years, and MIT has led both of them. Part of that leadership was defining the architecture that supported each vision. The building Costanza is moving his network into reflects the Institute's belief that a third engineering renovation is sweeping the technosphere. If MIT is right, a lot of us might be moving into buildings much like the Stata Center in the years to come. If not, if the building doesn't work, if, instead, it gets in people's way...

Well, the truth is, nobody dares even think about that.

OLD PARADIGMS, OLD BUILDINGS

For the first 75 years of MIT's history, from 1865 to 1940, engineering meant building and maintaining big pieces of equipment—locomotives, turbines, refineries—for large industrial companies. MIT's job was to train a sort of superapprentice, a person with an industrywide mastery of current designs and a sound understanding of the ideas behind them. Innovation was not a focus, although, naturally, good ideas were always welcome when they appeared.

After World War II, a second model for engineering emerged, one less interested in the day-to-day issues that governed industry and more concerned with mounting long-term assaults on big problems of general importance, like fusion or artificial intelligence. (The prime example of the form was of course the Manhattan Project, which birthed the atomic bomb.) This kind of activity was known as engineering science. It chased breakthroughs, and typically it was conducted by teams headed by a master of the subject. Researchers often were supported by grants from governmental agencies like the Office of Naval Research or the Department of Defense's Advanced Research Project Agency (DARPA).

Both models for engineering were expressed in the unique architecture of the school's buildings. The "superapprentice" era favored 30-foot bays connected by long, straight corridors wide enough for two carts piled with heavy equipment to pass. (From this requirement we got MIT's famous "Infinite Corridor," an 825-foot-long passageway that skewers five buildings on a single shaft of space.)

Engineering scientists, however, working long-term on big problems, needed little more than access to a computer and a workbench cluttered with circuit boards. Consequently, they did their work in small, scattered spaces that from the outside looked very much like office buildings in industrial parks.

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In the '60s, MIT needed space for the growing number of researchers interested in exploring the new digital disciplines. Since computer scientists didn't need access to the Institute's corridor network (their devices were not heavy and didn't need to move), MIT decided to house them in a commercial office building at the northeastern edge of the campus. This structure came to be known as NE43 (from its MIT mail address). It was in NE43 that the research and innovations associated with MIT computer science—artificial intelligence, public-key encryption, time-sharing—were made. This was where Marvin Minsky worked on AI, and David Clark supervised the development of many of the early Internet protocols. In fact, for a while the machines sitting in NE43 handled nascent Internet services (known as ARPAnet) for the eastern United States.

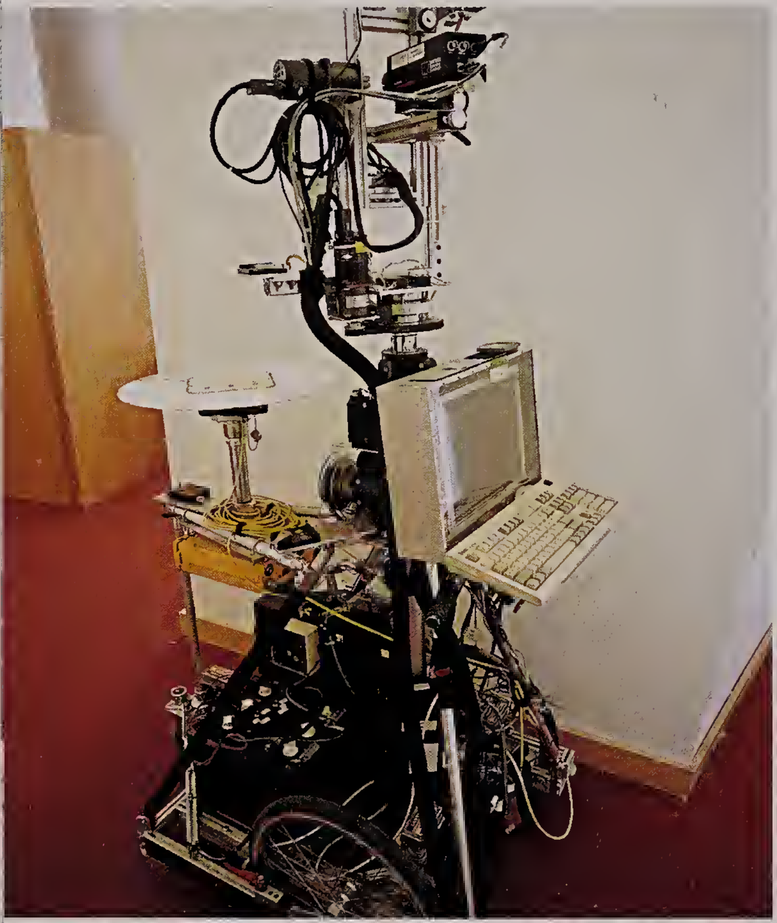
But as brilliant as its history may be, NE43 itself is a dim, narrow, characterless place. If you piled eight shoeboxes on top of each other you would have a fair model of the building. Ordinarily, this wouldn't have been a problem—the space was functional, especially as you could hack it up at will—but during the '80s and '90s, the culture turned computers and networks into the technology equivalent of movie stars. Any prospective donors or patrons looking for a tour of MIT's hot spots ended up in NE43. Housing computer science under such conditions began to seem like sticking the corporate offices of a Fortune 500 company in a double-wide.

A STAR BUILDING FOR A STAR SCIENCE

MIT's administration wanted to make a sweeping declaration of its support for the computational sciences, and in 1997, Analog Devices cofounder Ray Stata and his wife Maria lit the fuse with a gift of $25 million. They were rewarded with the promise that a new building would bear their names. A year later, as if compensating the labs for all those years they spent stuck in dingy old NE43, MIT hired the best (or at least most famous) architect in the world, Frank Gehry, to build its dream house.

Gehry toured NE43, listening to the researchers who, as much as anyone, were his clients. According to a representative at MIT, Gehry didn't ask the researchers what they wanted; he asked them about their routines—what they did during the day, who they went to when they had a problem, where they headed when they wanted to think. He used that information to figure out what they needed (as opposed to what they wanted).

The Stata Center's design indicates that Gehry came away from those interviews convinced that something big and new was going on in engineering.



LEFT: Argus the robot, created in MIT's artificial intelligence lab.
RIGHT: It's IT Director Jack Costanza's job to make sure the network is up and running.

The building is split vertically into alternating yellow brick and aluminum-colored metal sections. The brick pieces seem sliced out of the plain, rectangular, office building-like engineering science labs that were thrown up all over the country in the '50s and '60s. The metal sections bulge out between the brick walls—futuristic, full of energy, forward leaning. It is as though engineering science was a chrysalis and now a new suite of energies is bursting out.

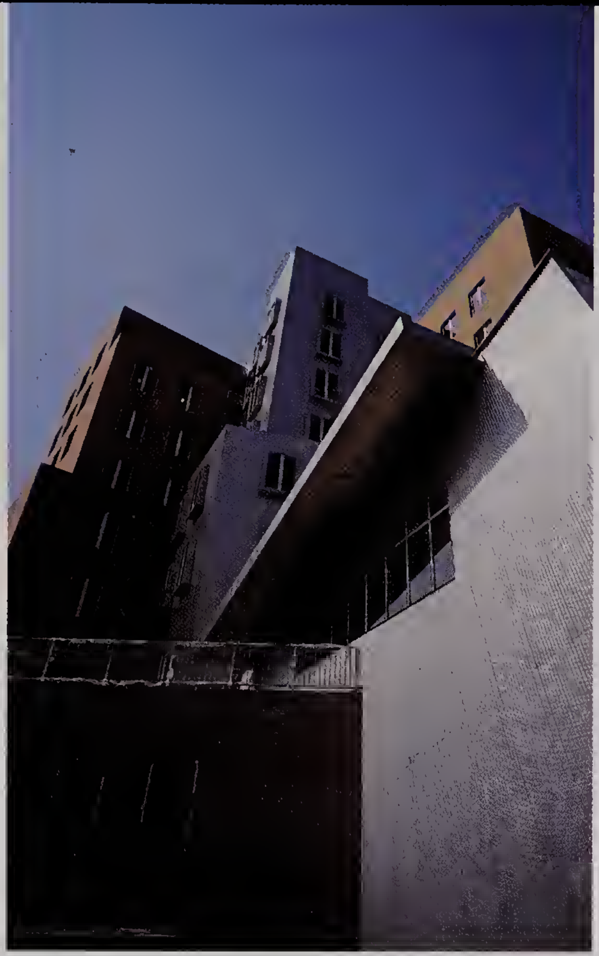
Gehry's design describes an epic metamorphosis in the way MIT understands engineering and in what it expects from its engineers.

THE NEW ENGINEERING PARADIGM

Many of CSAIL's projects are not targeting inventions on the engineering science model, not looking for breakthroughs, but seeking instead continuous, rapid improvements along a specific dimension. Project Oxygen, for example, which is billed on its website (*oxygen.lcs.mit.edu*) as an effort to bring "abundant computation and communication, as pervasive and free as air, naturally into people's lives," will never culminate in a single grand device, a locomotive of computation or a nuclear bomb of communication. It will, hopefully, make better and better versions of what we already have.

The power of device networking is a function of the number of devices, of sensors and actuators, connected to the network: a billion devices now, a trillion later and so on. In area after area, the projects at CSAIL today are about exploiting resource growth as it passes from the giga- to the tera- to the petabyte stage.

Engineering in the age of continuous improvement is not beholden to industrial clients (they're nice to have, but they come and go) as it was in the era of heavy industry, when the only consumers of the engineers' heavy metal were industrial giants. And subject matter experts are not as critical as they were in the time of science engineering because the nature of the constraints on a project are ever changing. Today's expert becomes tomorrow's neophyte, as one year's improvements come out of efficiency, the next out of extending operating life, the third out of better ease-of-use. Riding this engineering tiger demands the ability to manage huge flows of information, leap from issue to issue, organize new collaborations quickly, and plan to the curve—"we're going to have to be *here* in 2006 and *here* in 2008."



ONE BIG BUILDING

The Stata Center by the Numbers

$285 million: The cost of the Stata Center

719,000 square feet: The size of the Center, including parking

200,000 cubic yards: Of soil excavated for the foundation

150,000 tons: The weight of the Center

80,000 cubic feet: Of concrete in the floor slabs, columns, beams, slurry wall and mat foundation

11,000 tons: Of steel reinforcing all that concrete

72 miles: Of conduit embedded in the concrete for the electrical, telephone and data network pathways

1 million: Hand-laid bricks in the exterior walls

SOURCE: The Stata Center

Share Your Opinion

Is this the wave of the future? MIT's new computer science labs are a radical departure from past models. Would it work for your IT shop? Scroll to the bottom of the online version of this story and **ADD A COMMENT**.

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The Stata Center appears to have been constructed expressly to support this new engineering model.

INSIDE THE STRUCTURE

"It's a people building," says Chris Terman, associate chair of CSAIL, who asserts that the Stata Center's layout promotes conversation and interaction among people. It's designed for ease of movement. It promotes collaboration. It welcomes change.

The floors are raised so that cables can be pulled anywhere. Many of the walls are moveable, and many of those are half-height, like Jersey barriers, so that people can see each other. "The walls here are like furniture," says Garrett Wollman, a technician who works for Costanza.

The headwaters of intellectual activity in the Center will be found in small groups of desks clustered together in open spaces. While the desks can be moved anywhere in the space, it's easiest to visualize them pushed together, in tight, almost intimate collaborations. Each work space has enough dedicated resources (kitchens, conference rooms) to allow a team to keep to itself when it chooses. Take one step outside those spaces, and you are swept immediately into broader streams of traffic. Spiral staircases punch up and down to mix vertically (no need to go find an elevator); corridors, internal streets, flow horizontally through the work spaces like a network of streams connecting pools.

The architecture seems to support three levels of interaction: first among team members, then among the members of adjoining teams, and finally among all the teams, in a town center on the first floor. The center invites people to mix in every possible way. It has a café, a pub, a fitness center, a dance studio, an amphitheater and a direct connection to the campus swimming pool. In the internal courtyard that's surrounded by the building on all sides, there are cascading terraces, raised gardens and a hill with actual trees. Stata's is a landscape for interaction.

INSIDE THE INFRASTRUCTURE

Costanza walks into an empty room. "This is the holodeck," he says. "Who knows how much computer power this is going to need." He's not joking. This room is intended to support large-scale experiments in vision and imaging, and there's a computer center right next door ready to go.

Back in the day, networks were planned according to need. In designing the Stata Center's network, Costanza has assumed eight years of steady increases in demand. (The primary switch runs at a scorching 1.6 terabits per second; the dataports scale up to 1Gbps.)

The logic of continuous improvement engineering also affects network services. Historically, MIT labs have tended to maintain their own services—for example, their own e-mail and Web servers, backup systems and virus checkers. This made sense when research targets were long-term and teams were stable. But when flexibility is a requirement of research, one cannot assume continuity. Nontechnical people and people on short-term assignments (who might or might not be physically present) will be rotating in and out. As a result, networks have to support both a complete range of services—all the tools, all the operating systems—and provide the ability to opt out of any one of them should a researcher wish to design his or her own (for instance, the people working on vision research might want mailers optimized for very large files).

"Selection has to be à la carte," Costanza says. "You need a centralized and a decentralized services structure, running in parallel and equally accessible to everyone."

COSTANZA'S BRAVE NEW WORLD

All this novelty plays havoc with planning. Costanza walks into a room with a large U-shaped desk. "This is an assistant's desk," he says. He looks at the wall. "It has no phone." He walks around to the other side of the desk. "It has no dataport." He looks at the floor. "It has no power."

Every day when Costanza comes to work, he puts on a hard hat and tours the building. People with problems line up like refugees looking for food. Their questions go well beyond network issues. One worker asks if Costanza knows where the nearest working rest room is. He does. A team wants to confer about an upcoming fire inspection. Costanza has personally put a match to the insulation being installed. He has built makeshift clean zones around his $100,000 switches with yellow tape (like the police use at crime scenes). The tape keeps getting moved by mysterious forces.

The Stata Center not only reflects a new type of engineering, a new way of working and thinking, it also illuminates the problems we will have adapting to the new kind of world it creates. NE43 was a box, easy to figure out. There was nothing but flat walls and right angles, and everything stayed put. If a service was delivered to a desk, that desk would not turn up 10 feet away the following week.

The Stata Center, however, offers so many choices that thinking through them could take forever. And perhaps one shouldn't. Perhaps analyzing all the choices inherent in any given problem is no longer a worthwhile investment of time and energy. New decision-making skills may be needed. And if the rhythms of continuous improvement dominate the future of engineering, as seems likely, these are skills that many of us will have to learn. CIO

BOTTOM: The Stata Center's architecture is designed to support interaction on several levels.

Fred Hapgood is the author of *Up the Infinite Corridor: MIT and the Technical Imagination* (Addison-Wesley, 1993). You can send feedback on this article to *letters@cio.com*.

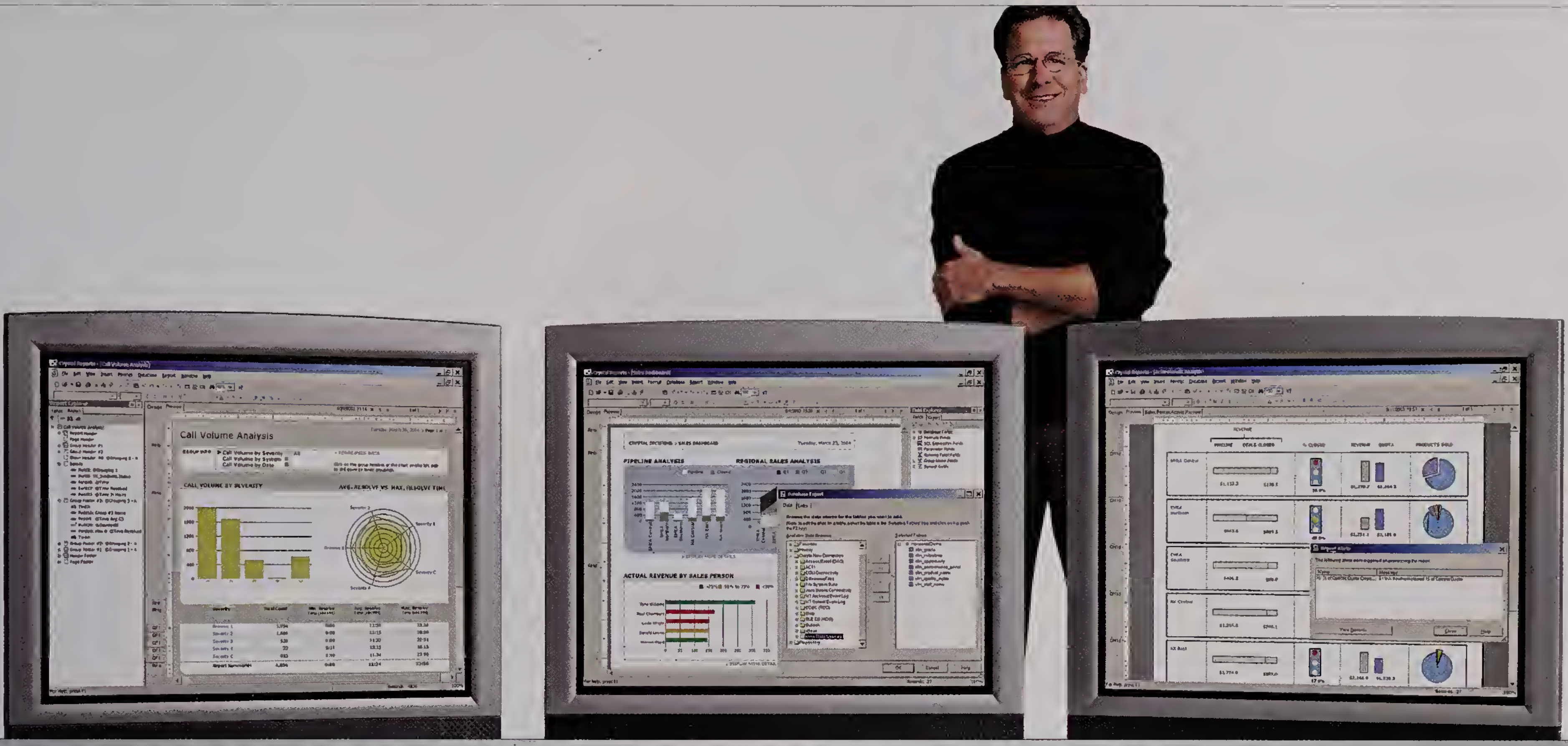

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ILLUSTRATION BY DOUG ROSS

Shifting Gears

How to exit the middle management road and roar down the upper management highway

Q: I am an accountant, and I have been working on accounting implementations for the past seven years. I have a master's degree in finance, I am a certified management accountant, and I am studying for my CISA. I have done a wide range of work—from implementation management and PL/SQL programming to mapping conversions of existing systems into new ones. My experience is primarily with Oracle-based accounting packages. My current work, however, has placed me into more of a troubleshooting and compliance role. I ensure that transactions are flowing through the system properly and adhere to rules like GAAP and FASB. I want to break out of the midlevel positions I have occupied for the past few years and move into upper management. Am I on the right track?

A: You have become a product of your own success. Specifically, you are being utilized in financial systems roles because you have considerable credentials and hands-on expertise in that discipline. This proficiency turns out to be both a boon and bane for your career. With the rising importance of Sarbanes-Oxley, the USA Patriot Act, shareholder activism and the like, folks like you who can develop and support accounting applications that ensure corporate governance and compliance are certain to serve as an important part in enterprise IT. But at the same time, this can easily become a limiting and confining competency that will pigeonhole you into the specialization you have acquired. What is clearly missing from your background is any involvement in your company's business—the planning, development, production, marketing, sales, delivery and support of your company's products and services. Until you get outside your accounting systems box and get closer to the revenue side of your enterprise, I'm afraid you are doomed to be a supporting actor rather than a franchise player. Compliance is simply not a strategic initiative.

–Mark Polansky, managing director and member of the advanced technology practice at Korn/Ferry International

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STUCK ON A SIDETRACK

Q: Over the past 25-plus years, I have managed to move myself up through the ranks from field service technician to national director of engineering. I have a bachelor's in computer science, an AAS in electrical engineering, and a BS in business management and information resource management—a very diverse background. I was downsized in October 2001 and have managed to find work as a consultant to the Transportation Security Administration on major, multimillion-dollar projects. I'm told I have a very impressive résumé and credentials. However, I cannot obtain an interview. The comments I receive are, "You're overqualified," and "Until the economy turns around, we're not hiring at your level." For almost four years the economy has taken the information technology world and fast-tracked it to the bottom of the demand curve. Although everyone agrees that this condition can't continue much longer, what do you see as the time frame for a turnaround? I fear that my goal of finding a position as a CTO or vice president of technology becomes less plausible as the time increases since I was at the director level.

Ask yourself what your long-term professional goals are. Is this business in an industry you find interesting? What is the company's reputation? Are you a fit for the culture?

A: My crystal ball is certainly no better, and hopefully no worse, than yours. I can't and so I won't predict the economy. I also can't forecast the job market, an important distinction since it now appears that economic recovery and job creation may not be as codependent this time around as we have come to expect historically. That said, I can tell you three things that address your concerns. First, the market is improving. The trend has been positive, to a limited degree, for several months. I expect that will remain true, but there's no telling how strong the rate of recuperation will be going forward. Second, the opportunities that do exist now are, for the most part, simply spectacular. There are many excellent companies that are doing quite well, and these organizations are hiring. And, venture investing and private equity activity appear to be emerging from hibernation. Third, from the comments you have received and quoted in your query, it sounds like you are prematurely pursuing your goal of a vice president or CTO position. If so, you are a "wannabe" in a down market, and that's not good. You will have to temporize your lofty objective, restart your corporate track as a senior manager or director, and resume your career march onward and upward from there.

–M.P.

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CHANGE OF LOCALE

Q: I am currently the corporate head of IT for a $600 million manufacturer, and I would like to relocate. I have been approached about a position as head of IT for a division of a Fortune 500 company, roughly the same size as the company I work for now but still growing. I would report to the division president and the corporate CIO. How would this move be perceived in the future, considering I would no longer be the number-one IT person in the entire organization?

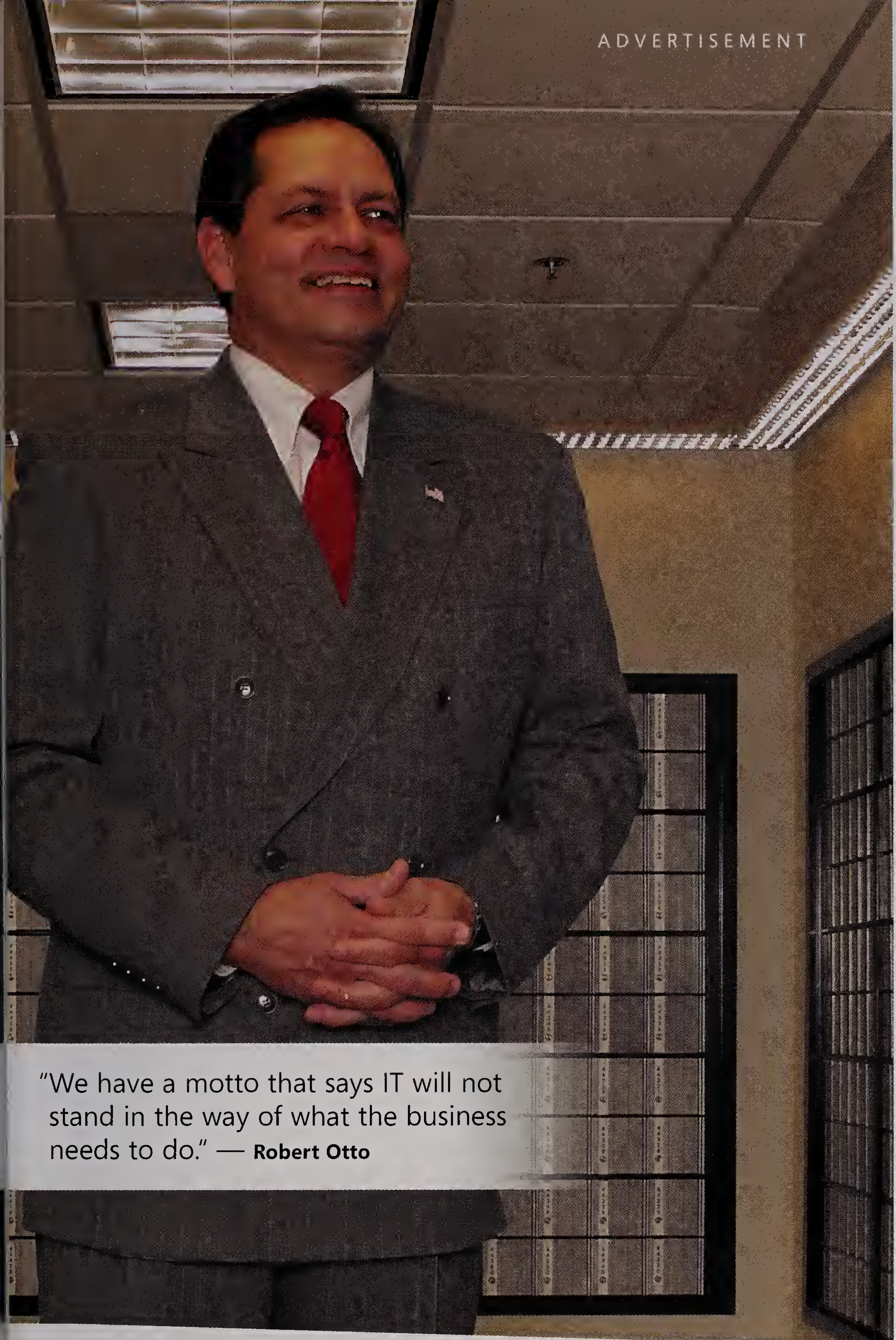
A: Your desire to relocate means you need to consider a new opportunity with a new employer. Do some soul-searching, and ask yourself what your long-term professional goals are. The answers will help you determine what milestones you need to accomplish in the next three to five years.

Ask yourself these questions about the job you're considering: Is this business in an industry you find interesting and know something about? What is the company's reputation in the markets where it competes? What precisely is the job description? Are you a fit for the culture? How does the organization perceive IT? Can you work for and learn something from the divisional president and the corporate CIO?

Although an outsider may perceive this opportunity as a lateral move, the position may provide you with all the technical challenge, general management responsibility and professional growth you need to prepare for the next assignment. Find out what the business plans are over the next three to five years and their implications for IT. If you find the job is challenging enough, my advice to you is to not get hung up on the reporting structure. I would encourage you to explore this opportunity with an open mind; you never know, the company may be looking for "bench strength," positioning someone like you to take the top corporate CIO spot in a few years. If that's the case, taking this position would make you look pretty smart.

–Gerry McNamara, partner of Heidrick & Struggles CIO

The Web-based Executive Career Counsel column, which can be found online at *www.cio.com/counselor*, is edited by Director of Online Research Kathleen Kotwica (*kkotwica@cio.com*).



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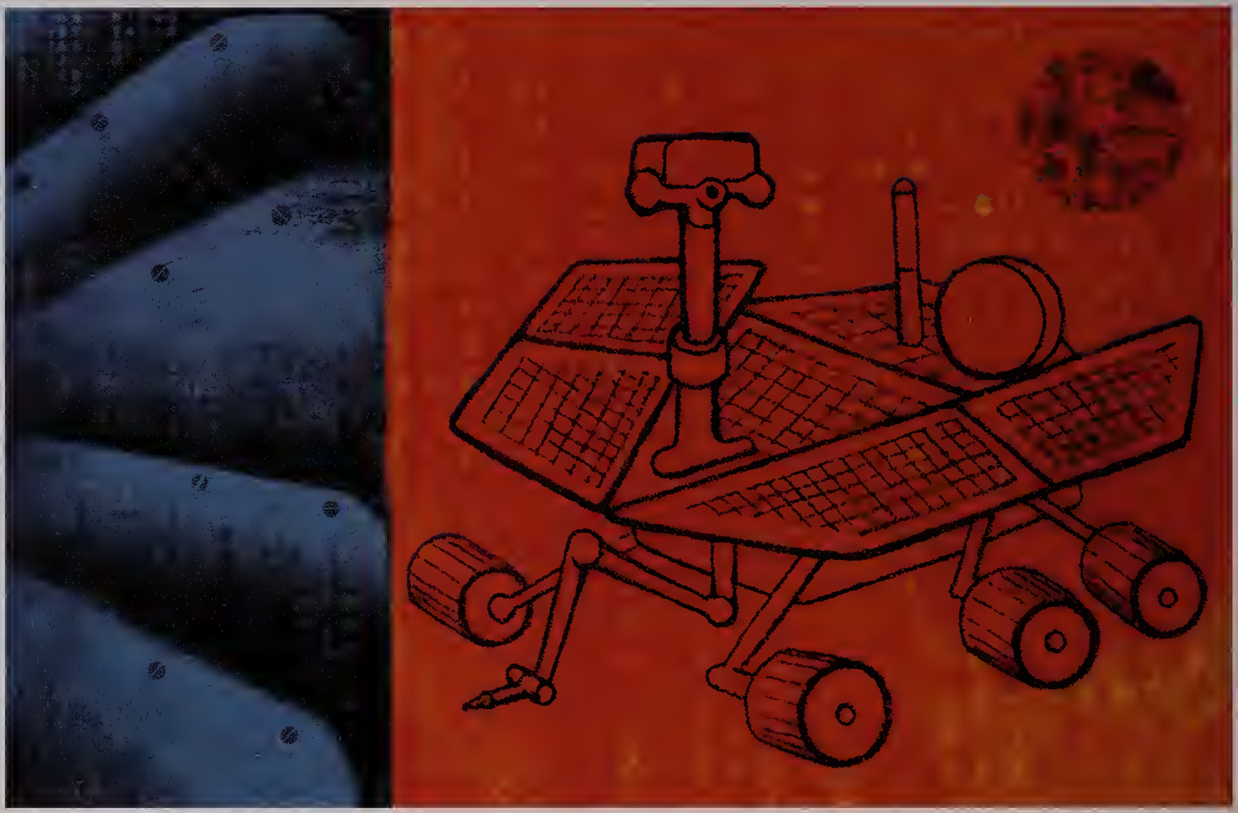
ESSENTIAL TECHNOLOGY

Edited by Christopher Lindquist

From Inception to Implementation—**IT That Matters**



ILLUSTRATIONS BY FERRUCCIO SARDELLA

Blade servers helped the Mars rover land safely while saving NASA money. That combination of high power and low cost is driving blade technology mainstream.

The Inevitability of Blade

BY JOHN EDWARDS

SERVERS | It's a long way from Tempe, Ariz., to Mars. So when distant and expensive data comes streaming in from NASA satellites orbiting the red planet and arrives at Arizona State University's Mars Space Flight Facility, it's important to utilize the information in the most cost-effective way. That's why the lab started using blade servers. "More CPUs are definitely better, and the cluster approach provides greater than 10 times more CPUs than, say, a Sun symmetric multiprocessing machine at the same cost," says Noel Gorelick, the lab's software manager.

Blade servers are compact because blades—processor, memory and storage on a card—reside in rack-mountable enclosures that supply power, ventilation and other support components. Like most cluster-based systems, blade servers can be configured to include load-balancing and failover (another blade can automatically step in to take the place of a failed card). Individual blades are usually hot-pluggable, which makes it easy to swap out a board with a new one in the event of system failure (for more details, see "Servers on the Edge," *www.cio.com/printlinks*).

As enterprises begin to recognize blade servers' potential to save space and cut costs, the technology has become increasingly popular. More than 150,000 individual blades were shipped in 2003, says Jeffrey J. Hewitt, a principal analyst at Gartner. That's a big jump from the year before when just 30,000 units shipped, he says. And market researcher IDC (a sister company

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to *CIO*'s publisher) predicts that 2.2 million blades will ship worldwide by 2007, representing 27 percent of all new servers sold.

Mission for Mars

The Mars Space Flight Facility at Arizona State University (ASU) is using a BladeRack system from RackSaver. The Mars team installed the system in January 2003 and uses it to translate the thermal emission imaging system data, gathered by instruments on satellites orbiting Mars, into clean, detailed images that are suitable for study. The facility's images helped NASA find optimal landing spots for the January 2004 landings of the Mars rovers.

Low cost, reliability and raw computational power are important to a program that performs cutting-edge science under a tight budget. "We usually build most of our computers in-house," says Gorelick. "We elected to buy the BladeRack because the vertical profile of each blade takes less space than an equivalent product we could build. Also, the community cooling, power and networking remove several per-machine failure points."

The biggest problem the Mars team experienced with its blade server was moving it into the building. "We were unable to get it into the Space Flight Facility without laying it on its side," says Gorelick. To reduce the unit's weight, allowing it to be safely tipped over, all of the blades had to be removed. The handling took its toll on the blades, however. "To no one's surprise, several ended up DOA, and several more died within the first month," says Gorelick. The blades were quickly replaced, though, and the system has since operated without any major problems.

The Mars researchers are so impressed with their blade server that they want to extend the technology to other ASU technical projects. "We're hoping to pool research money from several computer-intensive projects to produce a center for scientific computing," says Gorelick. "That could involve as many as 1,000 more nodes."

On a Wing and a Blade

Closer to Earth, Continental Airlines is relying on blade server technology to power its Web presence. Today, the company uses 24 Hewlett-Packard ProLiant BL40p four-processor blades, running Windows 2000, as Web servers. The Intel Xeon-processor blades are linked to conventional ProLiant servers that function as database clusters, giving customers the ability to view, price and book flights, as well as offering the airline easily scalable performance, space savings and streamlined management. The configuration is set to double in size when a backup Web presence goes online later this year.

The blade servers replaced several older Pentium-based ProLiant 580 servers, says Bob Edwards, vice president of systems technology for Continental Airlines. "We needed more power to handle Continental.com's sales, and when we did the upgrade we just transitioned over to blade technology."

Like most other blade server adopters, Continental acquired the technology to boost performance and save space, which should reduce costs in the long run. The system also helps the airline quickly scale its website to suit business surges and lulls. With the old technology, getting a new server online could take the better part of a day. "It was too late; the sale was over," says Edwards. Blade servers allow Continental to respond to rising demand much faster. "We can now deploy an image onto a

Like most other blade server adopters, Continental Airlines acquired the technology to boost performance and save space, which should reduce costs in the long run.

At the Movies: Blade Runner

Go to the movies, and whenever you see a rocket zoom through space, a robot reduce a city to rubble or a superhero flying in the sky, it's likely that high-powered computer technology generated that effect. At Threshold Digital Research Labs (TDRL), one of the world's leading digital animation and visual effects production studios, a bank of modern blade servers is the hardware behind the flash.

TDRL created the effects for movies such as *I Know What You Did Last Summer*, *Scary Movie* and *Spiderman 2*, as well as for the TV show *Frasier* (they made canine actor "Eddie" talk) as well as numerous other movies and television series. The company, located in Santa Monica, Calif., is currently halfway through the process of installing 250 IBM BladeCenter HS20 blades, each containing a pair of Intel Xeon processors.

At TDRL, creating movie-quality animation is a two-step process, requiring both servers and high-end animation workstations (IBM IntelliStation models). "The animation happens on the workstation, and the realization of the animation takes place on the servers," says George Johnsen, chief technology and animation officer at TDRL. The blade servers are replacing conventional form-factor machines (mostly IBM xSeries servers) that were "taking huge amounts of real estate and air conditioning resources to fire up," Johnsen says. Although cooling remains a problem, he notes that "the blade server offers us a tremendous amount of horsepower, a much smaller footprint and the ability to batch render animations much faster."

Johnsen says the blade server technology has exceeded his expectations. "Very quickly, you learn that they do a whole lot more than just another bunch of servers," he says. "So don't be afraid to push them hard, because they can take it."

–J.E.

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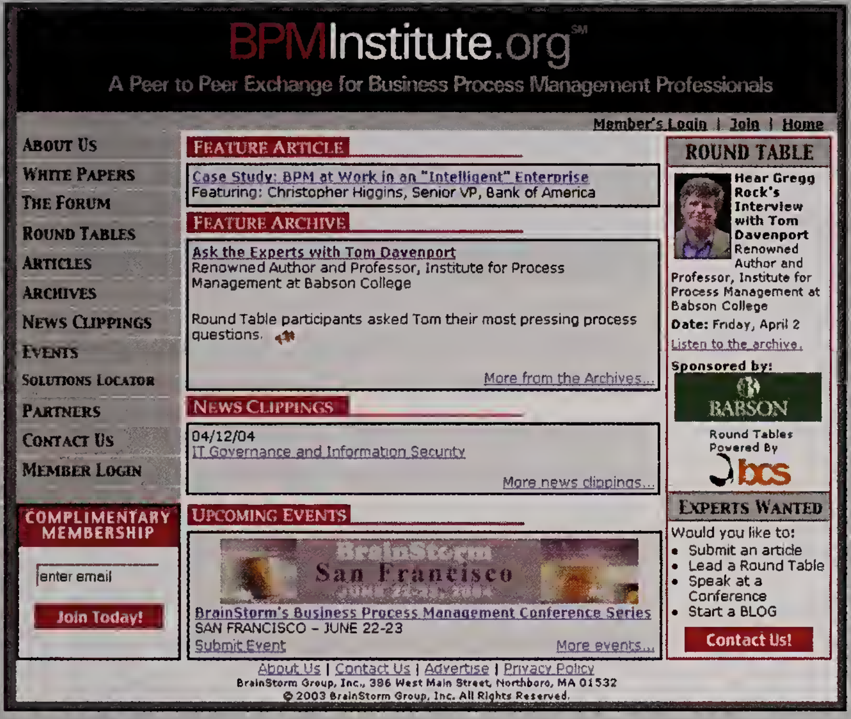

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Web server—application and OS—in probably one-tenth the time," says Edwards.

The blade servers haven't given Edwards any major headaches so far. He does, however, worry about the system's physical environment. "Because of the density, there's a lot of heat generated," he says. Like many other blade adopters, Edwards faces the prospect of adding enhanced cooling, such as improving the airflow between enclosures or even adding a water cooling system. "I did not anticipate the heat distribution problem," says Edwards. "You need to pay careful attention to where the servers are placed and how heat is managed in and around [them]."

On the other hand, Edwards appreciates the technology's space-saving attributes. "We had five racks originally; we're down to three racks now. That's a pretty substantial reduction in floor space," he notes. And deployment took only one month.

Compared to conventional servers, managing blades is a snap, says Edwards. He notes that having the servers near each other and managing them with HP's Insight Manager software streamlines administration. "For example, where we have 48 servers, the management utilities allow you to manage six servers in one array," says Edwards. As a result, the system has cut in half the time required by system administration duties. Edwards says this capability will free up staff to handle other tasks.

Quality of blade server management software varies widely between vendors, so it pays to shop carefully to find the right tools.

Although he's now a blade server believer, Edwards says that as recently as a year ago he wouldn't have considered adopting the technology because of concerns that blade servers hadn't yet proved their value. But time changed his mind. "We just felt like the technology had matured, and the advantages of using it for this particular application outweighed the disadvantages and risks."

Market researcher IDC predicts that **2.2 million** blades will ship worldwide by 2007, representing **27 percent** of all new servers sold.

Rising Sales

While sales are rising, blade server prices are heading in the opposite direction, thanks to strong competition between Dell, Hewlett-Packard, IBM, RackSaver, RLX Technologies, Sun Microsystems and other blade server vendors. Dell's blades, for example, start at about $1,499; enclosures begin at $1,799. Although ultracompact blade servers are significantly more expensive up front than their standalone counterparts (IBM's Xeon-powered BladeCenter HS20 costs around $2,500 with software, versus $1,400 for an equivalent standalone IBM xSeries 225), enterprises can reap rewards in reduced floor space, lower power consumption, simplified network cabling, and easier maintenance and administration.

Beyond the technology and attractive prices, enterprises are being drawn toward blades because the products are establishing a favorable track record. "People have had enough experience, at least the early adopters have, that they can see examples of how blades can really work effectively to help cut costs," says Rebecca Wettemann, vice president of research at technology analysis company Nucleus Research.

Upcoming "diskless blades"—units with no hard drive—promise to make blade servers even more popular. These devices increase the servers' mean time between failures, since drives tend to be the major source of hardware disasters. The technology will also let enterprises fully leverage a storage infrastructure—including storage area networks—into the blade environment. "Diskless blades are configured to be able to boot from external storage and utilize all of their disk storage needs using external devices rather than accessing local drives," says Gartner's Hewitt. "It will take some technical efforts to achieve this and have the blade servers run efficiently." Gartner predicts diskless blades will be available from all major server vendors by the end of 2008, although many blade server makers will offer the technology well before then.

The pending arrival of grid computing should also help boost blade server sales. Many see blades as a natural fit with grid technology, given blades' flexibility, high performance and cluster-based foundation (see "True Grid," Page 44).

Growing Pains

With blade servers now becoming entrenched in the IT mainstream, adopters and vendors are beginning to face issues that often affect maturing technologies. With blade servers, two key concerns are standardization and improved server management.

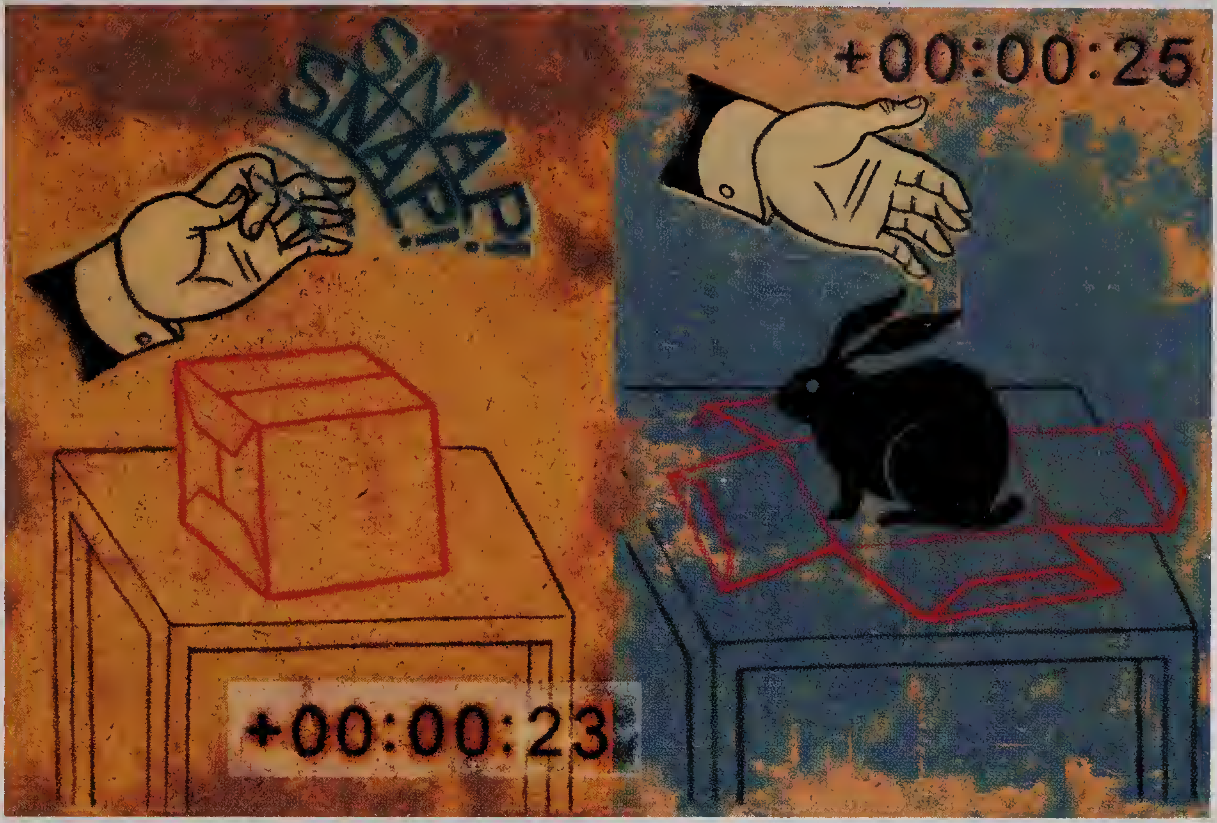
Continental's Edwards is pessimistic that there will ever be meaningful blade server standardization, given the current cutthroat competition that exists between blade vendors. "The idea of being able to take any vendor's product and plug it into that rack seems far-fetched to me," he says. Because of this, Edwards suggests that enterprises buy blade server technology to address a specific, immediate application. "Just like you would for a midrange system," he says. "Put it on the data center floor and plan on replacing the whole thing when it comes time to upgrade."

Blade management tools are often supplied to customers by the hardware vendors themselves. IBM, for example, bundles its Director management software free with its eServer blades. This means that many customers are drawn toward a particular blade server vendor on the basis of the company's management tools as well as its hardware. Software quality varies widely between vendors, so it pays to shop carefully to find the right tools. "If [the vendor] gets the management right, a blade server approach can deliver a great return," says Wettemann.

As the blade server market matures, more third-party software companies are entering the field, which is helping to expand the pool of available products. ASU's Mars team, for example, relies on job scheduling software from PBS Pro. Companies such as BladeLogic and Opsware also offer automation software to manage blades. These companies provide products that automate many configuration processes that are usually handled manually, such as the application of patches or the collection of inventory information. One advantage these companies offer is that their software can work with blade servers and traditional servers from a variety of vendors. Hewitt believes that blade management tools are destined to get better and become more widely available in the near future. "It will probably take two years to show maturity," he says.

In the meantime, for most adopters, blade servers' shortcomings in the areas of cooling, limited software selection, hardware incompatibility and limited track records are a small price to pay for powerful server capabilities in a small package at a lower cost. As Gorelick puts it, "More CPUs are better."

John Edwards is a freelance writer based in Arizona. He can be reached at *john@john-edwards.com*.



Instant Networks

WIRELESS | There's no doubting the convenience of wireless networks. Their flexibility and ease has made them both the joy and the bane of network administrators. But those very same administrators may have a new tool for configuring and securing their wireless efforts, if research from the Palo Alto Research Center (PARC) finds its way into commercial products.

The computer science group at PARC has developed technology it hopes will allow network administrators to quickly deploy wireless systems without compromising security. The research resulted from PARC's decision to use digital certificates for communication between wireless devices inside the lab. While highly secure, the devices would often take hours to get up and running. So researchers developed "gesture-directed automatic configuration." The technique permits two devices—say a laptop and a wireless access point—to identify each other and automatically configure a secure channel in less than a minute.

The technology uses a secondary channel, such as infrared, for initial communication between the devices. Using this channel, the systems exchange configuration information—including certificates—automatically. "You can only do that if you have physical access to the access point, as infrared has a very limited range," says Glenn Durfee, a security researcher in the computer science lab at PARC. And infrared isn't the only option. PARC is working on other solutions, from audio signals to USB tokens, that would work as well. For enterprises, users could bring unconfigured devices to an "enrollment station" (such as a specially configured access point or PC) in a secure location where the process could quickly take place.

PARC is currently seeking partners for licensing the technology, though it could not provide any details about when commercial products might become available. You can find more information by visiting *www.parc.com* and searching for "network in a box." (For a more complete description of the instant-network process, see "Instant Networking," *www.cio.com/printlinks*.)

–Christopher Lindquist

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Start with the Logic

BY ERIC KNORR

How to move Web services from the business analysts' minds to real applications

It's fantasy to think you can create an entire enterprise application infrastructure simply by stringing together a bunch of Web services.

WEB SERVICES | My son's favorite book is Richard Scarry's *What Do People Do All Day?* It brings to life dozens of disciplines, from coal mining to bread making, with charming illustrations. After reading this book for the 80th time, I wondered: What if you could drill down into each step of what people do, including all the procedures when things go awry?

Sadly, Scarry never went that far, so we're left to document our own business processes—in detail—for developers. Either that or someone in IT tries to match those requirements against shrink-wrapped enterprise software.

Everyone yearns for a perfect middle ground between build and buy. And increasingly, you hear about Web services and service-oriented architecture (SOA) as that ground: Just assemble prebuilt services into enterprise apps and satisfy endless needs. This is, of course, a fairy tale. People are building Web services and creating SOAs, but it's fantasy if you think you can create an entire enterprise application infrastructure simply by stringing together a bunch of Web services.

Yes, Web services contains business logic, and some even include Web services description language (WSDL) code to tell other programs what that logic will do. But today, Web services usually serve as integration points to full-blown applications, in much the same way application adapters connect proprietary middleware from companies such as Tibco Software, WebMethods and Vitria Technology. There are exceptions, but the true SOAs I've seen so far tend to involve fairly narrow applications and employ Corba or Java or COM components, not Web services.

There are two main reasons why Web services isn't there yet. Most obvious is performance—Web services protocols incur much more overhead than binary communications. Another issue is that homogenous development environments already have lots of tools for modeling business logic. Such tools are at a very early stage for Web services. And there's a debate in the industry over whether we need business process modeling for Web services at all. Some say that modeling and deploying business logic to orchestrate Web services introduces hopeless complexity.

With a towering stack of draft Web services protocols already making developers dizzy, the "how much more can we take?" question is valid. Business process execution language (BPEL)—the answer proposed by BEA Systems, IBM, Microsoft, SAP and Siebel Systems—takes a page out of conventional EAI solutions, which provide tools for building business logic at a level above that of the apps to be integrated. BPEL (pronounced "beeple") is now chugging its way through Oasis and purports to give developers a cross-platform method of pulling Web services together into larger, composite Web services applications.

BPEL provides a way to describe the Web services involved in a large, distributed Web services app, plus whatever XML schemata, WSDL, fault handling and constituent processes may be involved. All the big software players have indicated they will eventually build in BPEL support, but among startups, Collaxa stands out: Its BPEL Server 2.0, which should be shipping by the time you read this, is the first BPEL commercial product available. The company also has a visual design tool that functional analysts can use to model business processes and generate BPEL scripts to be consumed by the orchestration server.

BPEL will indeed add complexity at first, and I'm sure that whatever code is generated by Collaxa's or anyone else's products will serve largely as a starting point for composite Web services apps—a way for business analysts to explain what they need without writing a book. Without such tools, though, we'll never realize the promise of Web services as an infrastructure where services can be quickly rolled into apps that actually reflect what people do.

Eric Knorr is executive editor at large at *Infoworld*. He can be reached at *eknorr@pacbell.net*.

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Michael Hawley, Director of Special Projects at MIT, has accomplished many amazing things himself – named as one of the most creative individuals in America in 2001, won the Van Cliburn piano competition in 2002, did pioneering work in digital cinema at Lucasfilm, deployed technology for the 1998 American Everest Expedition, and recently published the world's largest book of photographs, BHUTAN. Hawley says, above all, he is proudest of his students, who have in turn gone on to accomplish their own amazing things. He shares insights on his own style of leadership, inspiring innovation and applying technology to benefit business and humanity.

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*SOURCE: **CIO** READER PROFILE STUDY, MRI, SEPTEMBER 2003

CIO
The Resource
for Information
Executives

EXECUTIVE Summaries

May 15, 2004

COVER STORY
Life After Outsourcing

By Meridith Levinson | 36

Between 2000 and 2002, Nextel signed long-term, big-money outsourcing contracts with Amdocs, IBM and EDS to take charge of everything except project management, application development and testing, which remained in-house. With about 60 percent of Nextel's IT outsourced, Senior Vice President and CIO Dick LeFave knew that his role would change, the makeup of his department would change and the lives of the 700 people working under him would change. This story examines the nature of those changes and the shift in responsibility and attitude for Nextel's IT chief, its vice president of customer billing services, the senior manager in IT operations for outsource vendor management and the manager of service delivery for data centers, who transferred from Nextel to outsourcer EDS.

> **"All the basic metrics I've used in the past to test both IT quality and cost are the same ones we use now and the same ones I expect CIO Dick LeFave to deliver."**
>
> –TOM KELLY, COO, NEXTEL

True Grid

By Christopher Lindquist | 44

GRID COMPUTING FACES HURDLES before it truly goes mainstream, but grid is no longer just a tool for techies decoding the human genome. Thanks to improvements in both hardware and software, more companies, particularly in financial services, are starting to take advantage of grid computing tools and are reaping the benefits of faster responses, reduced time to market for new products and lower prices per unit of computing horsepower. Wachovia, for example, linked hundreds of already-deployed desktop computers into a grid, taking advantage of every machine with available processing time. A job that used to take all day or overnight could now be completed in under an hour, allowing Wachovia to make exponentially faster risk and pricing decisions. The best candidates for grid are applications that run the same or similar computations on thousands or millions of pieces of data that are not dependent on previous calculations.

How REI Scaled E-Commerce Mountain

By Megan Santosus | 52

A LITTLE DIGGING AT OUTDOOR equipment retailer REI produced the fact that one out of every three people who buy something online will spend nearly $100 more if they go to the store to pick something up. The Web is simply not an isolated channel with its own operational metrics or exclusive group of customers. It's evolved into an important part of the shopping continuum, and smart retailers such as REI have mixed IT and marketing to maximize that complementary role. They have successfully used sales-driving practices such as designing their websites to give customers a unified view across sales channels and offering online shoppers incentives to come into a store to pick up orders, where they often buy additional items.

MIT Builds Its Dream House

By Fred Hapgood | 56

MIT'S COMPUTER SCIENCE LABS this spring moved into new digs, the $285 million, 719,000 square-foot Ray and Maria Stata Center, designed by world-famous architect Frank Gehry. Beyond its extraordinary appearance (it looks like something drawn by Dr. Seuss and then attacked by an anarchy-loving Cat in the Hat), the building is the physical correlative of a new concept of engineering, one that favors continuous improvement achieved by relentless collaboration over breakthroughs accomplished by isolated geniuses. To that end, everything in the Center is constructed to facilitate communication, from the state-of-the-art network built to accommodate eight years of increasing demand (the primary switch runs at a scorching 1.6 terabits per second) to the tortuous ramps and open meeting spaces that encourage ad hoc team formation. The underlying philosophy is that whereas engineering once meant moving machines to people, now it's the people that move while the machines are either stationary or (as is increasingly the case) ubiquitous.

Essential Technology: Blade Servers

By John Edwards | 68

BLADE SERVERS HAVE GONE MAINSTREAM. The technology has matured, and the space, energy and administration savings that blades offer can be compelling, particularly for applications that require large amounts of computing power under tight space and cost restrictions. But blades still have downsides, including larger-than-expected cooling requirements in some cases, as well as a shortage of mature system management tools. Plus there's no sign of blade standardization on the horizon; once you buy blades from one vendor, you're locked in for as long as you need to use that system. Still, CIOs using blades report that the pros outweigh the cons as long as companies are careful to pick optimal applications for the technology.

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